

MUNICIPAL JOURNAL AND ENGINEER

VOLUME XXII.

NEW YORK, MARCH 6, 1907.

No. 10

Published every Wednesday by
THE MUNICIPAL PUBLISHING COMPANY
Flatiron Building, Madison Square
New York City
Telephone, 6723 Gramercy, New York

A. PRESCOTT FOLWELL, EDITOR

TERMS OF SUBSCRIPTION, PAYABLE IN ADVANCE

United States and possessions, Canada, Mexico, Cuba, \$3.00 per year
All other countries 4.00 per year

Make all checks payable to The Municipal Publishing Company.

Entered as second-class matter, January 3, 1906, at the Post Office
at New York, N. Y., under the Act of Congress of March 3, 1879.

Readers are invited to contribute to the MUNICIPAL JOURNAL
AND ENGINEER, either in the form of special articles or of letters
discussing matters of current interest.

It is also desired that the facilities furnished by the reference
library in this office should be widely known and freely used by
those interested in municipal affairs. Visitors will be welcomed
and provided with conveniences for search, and inquiries by mail
will be promptly dealt with.

CONTENTS

Sewage-Polluted Ice	219
One Purpose of Curbs.....	219
Improving Suburban Streets and Roads (Illustrated).....	220
Hassam Paving at Somerville (Illustrated).....	222
Smoke Prevention in Cleveland.....	223
Testing Bitumens	223
Proposed Pavement Cross-section (Illustrated).....	223
Cost of New York's Parks.....	224
New Railways in Japan.....	224
Planning Towns and Cities.....	224
Sheet Asphalt Specifications.....	227
Hydrant Rates in California.....	228
Waterworks of Muskogee, I. T. (Illustrated).....	229
Specifications for Cement Sidewalks.....	231
The Disposal of Municipal Waste. By W. F. Morse.....	232
No Seat, No Fare.....	235
News of the Municipalities.....	236
Legal News—A Summary and Notes of Recent Decisions.....	241
News of the Societies.....	241
REVIEW OF THE PERIODICALS	
Indexing Periodicals	242
The Flicker Photometer.....	242
The Hudson River Tunnels.....	242
Park Development	242
An Artistic Elevated Road.....	242
Municipal Housing in England.....	243
Graft in England.....	243
The Municipal Index.....	244
THE WEEK'S CONTRACT NEWS.....	248
Personals	255
Trade Notes	255

Sewage-Polluted Ice

THE story is told of a physician finding in a lonely district a family whose water supply was a spring at the foot of a hill on which, immediately above the spring, was a well-filled family burial ground. A suggestion that the general ill-health of and numerous deaths in the family were due to drainage from this into the spring was met by the surprised and indignant reply, "Why, they are all our own folks up there!" It must have been one of their descendants who, as an officer of the American Ice Company, excused to protesting New Yorkers

the cutting of ice near the outlets of the Albany sewers by explaining that such ice was used in Albany only; and it must have surprised him that the residents of that city did not consider this to be any mitigation of the offense. The local ice dealers denied the truth of the statement; but no one seems to have denied that ice was cut at the point designated.

The danger from polluted ice is too little appreciated, and the distribution of it too free from all control by health authorities. If the typhoid record of the past year teaches nothing else it should call attention to the fact that there are other agents than water in the distribution of typhoid germs; and the widespread use of ice and the almost complete absence of control of its collection make it an especially favorable medium, if it can be one at all. Concerning this there is some little dispute, but only a little. It seems to have been proved that typhoid bacteria can survive in ice for long periods of time, although both their numbers and vitality decrease after the first few days. Freezing of water tends to drive bacteria into the unfrozen portions; but if all parts are frozen, as when ice is overflowed or when shallow water freezes to the bottom, the bacteria are merely concentrated into the parts last frozen. Artificial ice needs oversight as well as natural; as was demonstrated last year in Montclair, N. J., whose health board found in one make of artificial ice more bacteria than in any of the natural ice.

One Purpose of Curbs

ONE purpose of curbs is to keep teams from the sidewalks. A striking illustration has been offered during the past three weeks by West Twenty-third street, New York. During that time no curb or other demarcation between the crowded roadway and sidewalk has been visible or effective, owing to the well-packed snow and ice in the gutters. As a consequence automobiles, coal and express wagons and all classes of vehicles except street cars contest the sidewalks with thousands of commuters. A permanency of such conditions would be intolerable. Hence curbs. Under certain conditions the exclusion of vehicle traffic from certain areas is effected by other means; as by a row of shade trees along each side of the roadway, or by ropes supported by temporary standards to provide safer crossings for pedestrians or to control traffic. But for the latter at least curbs would be much more effective; and in a crowded street the trees would be apt to suffer from abrading hubs unless themselves protected by curbs. Cobbled or sodded gutter slopes are excellent for village streets, but are useless as guards against traffic.

IMPROVING SUBURBAN STREETS AND ROADS

Necessity Caused Partly by Automobiles—Methods of Laying Dust—More Permanent Improvements—Brick Paving Country Roads—Wood Block and Tar to Meet English Conditions

FROM the rapid growth of the tendency for business men in large cities to locate their residences in more or less distant suburbs there has resulted, among other changes, a rapid improvement in the street paving demanded for the suburbs; and this is now being followed by great improvements in the main highways, one of the most influential factors in effecting this being the automobile. It is not only through the moral and political suasion of the automobile owners that this is brought about, but the physical effects of the machines themselves have made some action necessary. It is found that the heavy and speedy automobile appears to suck out the dust binder of macadam roads and spreads it in blinding clouds over the adjacent country; one result being hastened raveling of the road metal and destruction of the road. To meet this three general methods have been employed: The treatment of macadam surfaces with some substance which will lay the dust more or less permanently; the construction of at least the top coat of macadam with a binder, such as tar, and the substitution for macadam of a more expensive pavement.

For dust-laying oil, tar, calcium chloride, "westrumite" and other substances are being used or experimented with. As additional binder tar and asphalt are the most common, from one point of view the use of concrete, as in the Hassam pavement, might be included under this head, although it should probably be more correctly classed under the third. The improved pavements include brick, wood and stone blocks, asphalt, bitulithic and others.

DUST LAYING

The methods of using oil have been described in recent numbers of the MUNICIPAL JOURNAL. It has found its most extensive use in California and the Southwest, although quite a number of districts as far east as Long Island have applied it with success. Among California cities the following reported last December as to the extent of such use during the previous year: Fresno, 31 miles; Bakersfield, 26 miles; Pasadena, 15 miles; Riverside, 25 miles; Redlands, 12½ miles; Hollywood, 15 miles; South Pasadena, 20 miles.

Calcium chloride has been tried in England and is being introduced in this country. Its value lies in its characteristic of absorbing moisture from the atmosphere, and so keeping a street damp much longer than would ordinary sprinkling. It is dissolved in water at the rate of three pounds per gallon and applied by an ordinary sprinkling cart. A first application should be repeated after an interval of a day, these two requiring about one gallon for each 1.6 square yards and one for each 2.7 square yards respectively; subsequent sprinklings (every three or four weeks) requiring the latter

amount. Sea water has been used in much the same way, and what benefit results is due to the same property possessed by the salt of absorbing water. Westrumite is sprinkled as above, but its effect is due to the dissolved bitumen, which serves to bind the top surface and so weight down the particles as to prevent their rising as dust.

USE OF TAR AND ASPHALT

Tar is used both as dust layer and binder; more commonly in this country as a binder for the top layer. We have previously referred to the results obtained, and give herewith a description of the latest method of applying "Tarvia" (a coal tar preparation in common use for this purpose).

The road to be treated should be well built, firmly bonded macadam in fairly smooth condition. If the road to be treated is a new one, it should be built in the usual manner, and, after the road is puddled, sufficient screenings spread over the surface to protect it against ravelling by the traffic, which may use it for two to six weeks, or until the road is thoroughly dried out, when the screenings which are not bonded should be removed, leaving exposed the inch or inch and a half stone which forms the wearing surface.

If it is an old road which is being treated, all screenings, dirt, etc., which are over the inch or inch and a half stone (whichever is used for the wearing surface) should be removed, either by sweeping or by scraping if the screenings are caked. Many roads are maintained by keeping from one-half inch to one and a half inches of screenings which have passed a quarter or half-inch mesh caked on the surface by continually wetting and rolling, and it is absolutely necessary that these should be removed in order to make a satisfactory job. If they are not removed, the result is that as soon as these screenings are



SPREADING TAR ON A MACADAM ROAD

dry the adhesion is destroyed, and the screenings become entirely loose, thus breaking the entire tarred surface; consequently they must be removed, even by scraping if necessary.

After the macadam is thoroughly cleaned and perfectly dry, it is coated evenly with Tarvia heated to a temperature of from 160 to 180 degrees Fahrenheit, using from one-third to one-half gallon per square yard. Various methods for heating Tarvia have been used; namely, tank wagons holding from 500 to 600 gallons, with fire boxes; roofing kettles mounted on wheels; and in many places the work has been convenient to the factories, so that the Tarvia is delivered hot direct from the factory and no heating is required. The hotter the day and the hotter the Tarvia (up to the above maximum) the better the result.

Sprinklers for distributing from the tank wagons, made of pipes with slots and small holes, have been used in the hope of doing away with the sweeping, but so far nothing of the kind has given a distribution uniform enough to permit this. The most satisfactory method has been to use a hose attached to either the tank wagon or the roofing kettle, allowing the Tarvia to flow from the open end onto the road, and sweeping with street sweepers' fiber brooms.

After the Tarvia has been allowed to penetrate the road for from two to twelve hours (traffic meantime having been kept off) it is covered with an even layer of crushed stone screenings which have passed a quarter or three-eighths inch mesh, with not more than 50 per cent. fine material. The entire surface is then rolled, with steam roller if possible, and if there are any black spots showing through the screenings behind the roller, additional screenings should be applied and again rolled until the black spots do not show after the rolling. After a period of from two to six weeks, depending somewhat on conditions, the loose dust and screenings which have not been bonded with the Tarvia can be removed, leaving the surface perfectly smooth and clean. The first application of Tarvia generally makes the road dustless for about a year. Applications thereafter are required every two years, less and less Tarvia being used each year.

Asphalt is generally applied in the form of asphaltic oil. When the Santa Monica method (see MUNICIPAL JOURNAL, October 3, 1906) is employed it practically results in the asphalt acting as a binder. With either tar or asphalt, however, the actual wear is on the materials which these bind together, and the life of the road must be determined by their toughness and hardness, although it will, in most cases, be lengthened by the use of such binders.

BRICK PAVED COUNTRY ROADS

The paving of roads outside of city limits with any material more expensive than telford macadam (possibly treated with oil or tar) would appear to many to be out of the question in this country where distances between populous centers are so great; and it will, we believe, be news to many that in the vicinity of Cleveland, O., 110 miles of road have been paved with brick

at a cost of about \$23,000 a mile. Many of these were formerly almost impassable clay bogs at times. Sixteen roads leading from Cleveland have been paved and others are already under contract. Mr. R. J. MacKenzie, County Commissioner, states that it is the intention of the commission to spend \$300,000 a year until every road in the county is paved. It is expected that every main road will be paved in three years, after which the cross roads will be taken in hand. In paving these roads great care is taken to obtain good drainage. A solid sub-grade is obtained, the foundation is constructed of broken stone thoroughly rolled and covered with a sand cushion, upon which the brick are laid. Generally, curbing is placed along the side of the paving to prevent the spreading of the bricks along the edges. The work is done by contract under supervision of the Board of County Commissioners.

Mr. H. S. Grimes, in a paper read last month before the National Brick Manufacturers' Association, said:

"I could cite you now to several inlets to different cities, called county roads, that are being improved by paving with vitrified block. In our immediate neighborhood we have a road paved with vitrified paving brick a distance of five miles, and it is one of the prettiest driveways that could be made. It leads from a small village into the city of Ironton and diverts the trade from another city direct to Ironton on account of the excellent condition of the roadway. Such situations will eventually exist all over the country, and before many years I would not be surprised to see large improvements in the way of paving county roads, especially those that connect small villages with larger cities where traffic is very heavy and the ordinary macadam road is unfit for use in bad weather."

ENGLISH METHODS

The following extract from the annual report of Mr. O. Claude Robson, M. Inst. C. E., engineer and surveyor to the Willesden Urban District Council, shows that the same problems exist there as here, and describes how they are met:

"With the rapid increase of motors upon our roads, and more especially the introduction of the heavy public motor omnibuses, it is possible that the extension of wood-paved roads will become more imperative in the future, as the demands of the motorist as to perfection in roadways are even more general than was the case with the bicyclist. At the present time the automobilist poses as a greater expert upon the construction and maintenance of roads than those trained and experienced therein, and more than one letter has appeared in public print ridiculing the present method of road making and comparing it unfavorably with past ages or the times of Macadam and Telford. With all due respect to such critics, I must most distinctly disagree with the conclusions arrived at. Even in my own time considerable improvements have been effected in road repair, the main roads of the country forty years since being in no way comparable to those of the present day, while in remoter times there was an even worse condition of affairs, notwithstanding the paucity of traffic then existing. It is rather the more sensitive character of vehicle, and equally more sensitive character of travelers in the present day that prompt people to condemn the roads of this period and compare them unfavorably with those of Telford and Macadam than a reliable knowledge of the method of road formation and repair now and in the past.

"Owing to the modern requirements, therefore, some of the best of the macadamized roads of the present day must give way to wood paving where much motor traffic exists, thus materially increasing the annual cost of maintenance, which it appears to me should be defrayed by an increased license in the case of

motors, with a generous contribution from the fund thus raised to the road authority for the additional expenditure involved by the motor traffic, as there is not only the question of the wear and tear to the road to be considered, but the equally important matter of settling the dust problem in connection with the use of the motor, which also means additional cost.

"With regard to this question, experiments have again been made with tar paving as a surface for roadways, 316 yards having been laid in Cavendish road, in addition to the 1,491 yards laid in Granville road in 1904. The material consisted of granite in three layers, the bottom layer being of 2-inch stone 3 inches thick, and the topping of 1¼-inch and ¾-inch stones, each 1-inch thick respectively when consolidated. The paving stands well, and will, I believe, last for many years on these roads if judiciously and periodically "painted," an important item in the life of all tar-paved surfaces. It is in this direction, I believe, that the reform will take place in road repair, so as to avoid the nuisance of motor dust, as I know of no ordinary stone repaired roadway that will be free from the dust of motor traffic, let it be ever so well made and maintained. Even with the tar-paved road, dust must arise, but with the material bound together with a tar medium less erosion will take place, while the surface itself will be kept more cleanly than is possible with a gravel, flint, or macadam surface."

HASSAM PAVING AT SOMERVILLE

ON June 13, 1906, the Hassam Paving Company was formed to lay pavements under the patents of Walter E. Hassam, formerly Street Commissioner of Worcester, Mass., which patents had been granted May 1. Since then more than 100,000 square yards of this pavement have been laid in Boston, Lynn, Cambridge, Worcester, Taunton, Somerville and Spencer, Mass. (the last being about a mile of State road); in Nashua and Manchester, N. H., and in Derby, Conn., and contracts have been made by other cities for similar paving to be laid this year. As this is a new kind of paving a description of its actual construction in Somerville will probably prove of interest. In this city about 26,000 square yards were laid by Simpson Bros. Corporation, the Boston agents, upon Medford Street, Broadway and Union Square, points subject to very heavy traffic. The construction was under the inspection and oversight of City Engineer E. W. Bailey.

The roadway was first excavated to a depth of six inches below the proposed finished grade and the sub-grade thoroughly rolled; all soft and spongy places were dug out and replaced with good material, especial care being taken to have the sub-grade as solid as possible. Upon this was spread a layer of crushed stone, varying in size from 1¼ inches to 2½ inches in the largest diameter, which was thoroughly rolled to a thickness of four inches. Upon this was poured a grout, consisting of one part Portland cement and three parts of fine sand, until the voids were filled and the grout flushed to the surface.

Upon this foundation course was then spread a layer of trap rock of the same size rolled to a thickness of two inches. Upon this layer was poured a grout consisting of one part Portland cement and two parts sand, until the voids were filled. The finish course was then put on, consisting of one part of Portland cement, one part of sharp sand and one part of pea size trap rock, brushed evenly over the surface. Proper proportions of lamp black were used in the finish course to produce a pleasing color similar to the natural color of trap rock. The

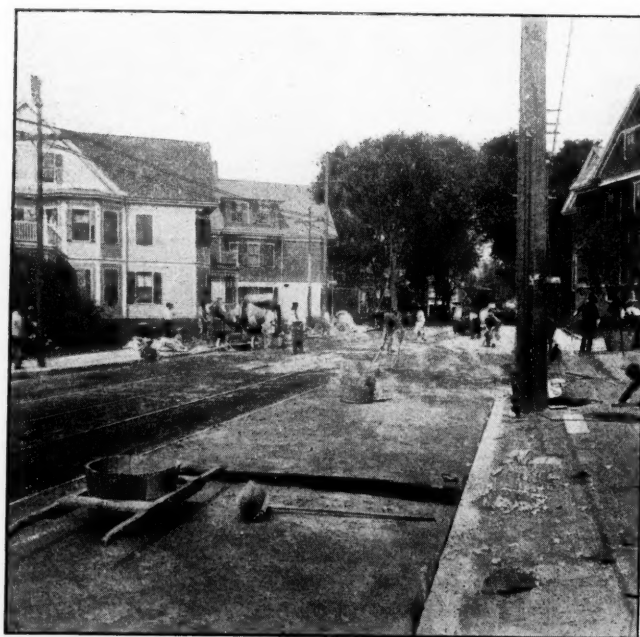
different layers followed closely after each other and were thoroughly rolled during the process of grouting, so that the mass was solidly compacted before the cement had taken its initial set. The completed pavement was then allowed to stand for six days before traffic was turned on to it.

To provide for expansion, one-inch boards were set against the curb lengthwise with the street, and at intervals of about one hundred feet were placed across the roadway. After the cement had hardened sufficiently these boards were pulled out and the space filled with a paving pitch. On some parts of the work no expansion joints were provided and close watch has been kept to determine if they were necessary. From observations of this and similar work it would appear that there is no real necessity or advantage in providing expansion joints.

The pavement on Broadway was laid up to the rails of the Street Railway Co., which had recently been relaid, and it was soon found that the movement and vibration caused by the passage of heavily loaded cars prevented the proper set of the cement, so that it was deemed necessary to excavate below the cross ties and under the rail and fill with crushed stone thoroughly grouted. This gave a firm foundation for the street car rails, and, being consolidated with the pavement, made a very substantial construction. On Medford Street the street car tracks had been laid a number of years and were settled to a solid bearing, and no difficulty was experienced in laying the pavement along the rails and securing perfect work.

The surface of this pavement has the general appearance of a clean macadam road after being dried out, and the footing for horses is as satisfactory as on a hard macadam.

The only equipment needed for laying this pavement is a steam roller, a concrete mixer and a pump. For



HASSAM PAVEMENT UNDER CONSTRUCTION, SHOWING BOARDS FOR LONGITUDINAL AND TRANSVERSE EXPANSION JOINTS

small areas the mixer and pump can be dispensed with, the mixing and pouring being done by hand.

Smoke Prevention in Cleveland

THE Supervising Engineer of Cleveland, O., who has charge of the enforcement of the smoke-prevention ordinance, gives an encouraging report for last year, encouraging to other cities as well as his own, and which should arouse many of them to greater activity.

"The improvement in smoke conditions in the last year has been marked. Not only have a large number of plants been equipped with mechanical stoker and smoke-preventing appliances, but a number of plants have been equipped with gas engines. Others have adopted electric power, while the steam lines laid along Prospect Street by the Illuminating Company have enabled several buildings to shut down their boiler plants. The coming year will undoubtedly see an extension of steam lines through the downtown section of the city, and it is to be hoped that eventually it will be possible to shut down all the heating plants in the business district and supply these buildings with steam from well equipped modern boiler plants.

"During the year 1906 fifty-four (54) boilers were equipped with mechanical stokers and ninety (90) boilers with automatic steam jet devices.

"We now have in this city a total of almost 800 mechanical stokers in operation and over 400 automatic smoke-preventing devices, and the volume of smoke as compared with the time previous to the organization of this office shows a decided reduction."

About 10,000 tons of coal are burned per day for power purposes. A committee of railroad officers last year recommended that all switching engines be equipped with steam jet and air devices, and practically all have been so equipped. One of the chief difficulties at present is to compel the firemen to use the appliances properly, and the section of the ordinance making them personally responsible under such conditions is to be enforced.

Testing Bitumens

THE testing of oils and light tars for treating road surfaces and of bitumens for use in paving in a way which will permit a practical rating of their comparative values is a matter of great difficulty. The determination of their chemical constituents is practically useless, as these have little or no bearing on their physical properties. Service tests are impracticable because of the time required and the impossibility of duplicating conditions of use. The physical tests now used are: Susceptibility of the material to changes in temperature; ductility; and brittleness. The first is ascertained by taking the penetration of the bituminous cement at different degrees of temperature; by this being meant the distance a weighted needle will penetrate under a given weight in a given time. Ductility is determined by ascertaining the distance in centimeters a briquette made of the material will elongate before breaking. Brittleness is determined by ascertaining the distance a 25-gram weight must drop to

break a prism of the material having a section one cm. square and a length of ten cm., resting on supports eight cm. apart; the test usually being made at 30 degrees F.

Mr. A. W. Dow has discovered certain apparent interrelations between these various characteristics, which he described before the Am. Soc. for Testing Materials:

"On comparing data obtained on bitumens with these tests it was noticed that a definite relation existed between the degree of susceptibility to change in temperature, the ductility and the brittleness." "In nearly every case a definite relation exists between these three physical properties; that is, the more susceptible to change in temperature, the more ductile and at the same time the more brittle is the material." Other experiments, taking the penetrations with the same weight and at the same temperature, but varying the time interval, show that the greater the ductility the greater the variation between the penetration taken at the different time intervals, and this whatever weight or temperature was tried. It was also found that the more ductile bitumens are the more fluid; in fact, a very hard California oil residue has considerably more flow to it than a soft hydrolite bitumen.

PROPOSED PAVEMENT CROSS-SECTION

THE ordinary parabolic curve used as the transverse contour of a pavement possesses the faults, in the opinion of Mr. H. H. Gladding, of New Haven, of being too flat at the crown and too steep at the gutter. The other extreme would be a straight line from crown to gutter, which has its objections. Mr. Gladding proposes using two half parabolic curves, making an angle at the center of the road. In a paper before the Connecticut Society of Civil Engineers, which we reproduce herewith, he gives the data for laying out such a cross-section:

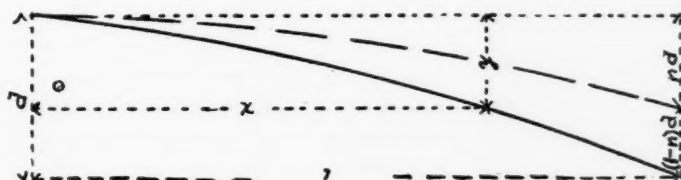
Let l represent the horizontal distance from the vertex to the lower end of the curve (Generally half the roadway width).

Let d represent the total difference in elevation between the ends of the desired curve (Drop from crown to gutter).

Let nd be any assumed portion of d .

Let $(1 - n)d$ be the remaining portion of d .

Let x and y be the coordinates of any point on the curve, the origin being at the vertex.



The broken line in the sketch is a preliminary curve tangent to the horizontal at the vertex, and with its lower end at a distance nd below said horizontal line: its ordinates will be found by the usual parabolic formula,

$$y = \frac{x^2}{l^2} nd.$$

Suppose this curve to be rotated about the vertex until its lower end has moved downward through the remaining portion of d , viz., $(1-n)d$: the additional ordinates caused by this rotation will be in direct proportion to their horizontal distances from the vertex, and will be expressed by $\frac{x}{l}(1-n)d$.

The sum of these two partial ordinates will, of course, give the ordinates of the curve in its final position; so that we have for the general equation, $y = \frac{x^2}{l^2}nd + \frac{x}{l}(1-n)d$, from which equation the tables were computed.

The amount of the total ordinate d of the curve is a matter for the judgment of the engineer in charge. $d = .04l$ will probably be sufficient for roads carefully shaped by a road roller. For very smooth, hand-laid pavements, $d = .03l$ would seem ample.

EXAMPLE:— $l = 15'$, $d = .04l = 0.6'$; take $n = \frac{3}{4}$. From the table, the ordinates at $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$ of the distance from the vertex to the gutter will be .11d, .31d and .61d; or in feet, .066', .186', .366'.

The initial pitch at the vertex is the amount of the tip down $(1-n)d$, divided by l , and in the above example amounts to .01, a one per cent. grade.

But one of Mr. Gladding's tables is reproduced; in the others x and n are given in fractions instead of tenths:

$x =$.1	.2	.3	.4	.5	.6	.7	.8	.9
$n = .1$.091	.184	.279	.376	.475	.576	.679	.784	.891
.2	.082	.168	.258	.352	.450	.552	.658	.768	.882
.3	.073	.152	.237	.328	.425	.528	.637	.752	.873
.4	.064	.136	.216	.304	.400	.504	.616	.736	.864
.5	.055	.120	.195	.280	.375	.480	.595	.720	.855
.6	.046	.104	.174	.256	.350	.456	.574	.704	.846
.7	.037	.088	.153	.232	.325	.432	.553	.688	.837
.8	.028	.072	.132	.208	.300	.408	.532	.672	.828
.9	.019	.056	.111	.184	.275	.384	.511	.656	.819

Cost of New York's Parks

THE original cost of the land used for parks in the Bronx and Manhattan, New York City, to date, has been over \$36,000,000, of which \$10,467,796 has been paid since 1895 for twelve small parks having a total area of 103.8 acres, or \$100,816 per acre; the site for Mulberry Bend park having been the most expensive—\$553,474 per acre for the original park and \$987,830 per acre for a later addition; and that for Fort Washington park, the cheapest—\$22,158 per acre. In 1906 \$2,803,357 was appropriated for the parks of Greater New York.

New Railways in Japan

AN underground railway is to be built across Tokio, Japan, a distance of about twelve miles, and it is estimated that the work can be done for as low as \$625,000 a mile. A company, with a capital of \$7,500,000, has been formed for the purpose, and it is planned to have a uniform fare of 2 1-2 cents, which will produce a dividend of 8.2 per cent. The Electric Tramway Company, of Tokio, has also asked for sanction to extend its system by the construction of sixty additional miles, and propositions are also being considered in other cities in the island for huge railway undertakings.

PLANNING TOWNS AND CITIES

Principles Advocated by German Authorities—Provisions for Future Growth—Streets, Squares, Class Districts and Buildings

PROF. BAUMEISTER, Germany's greatest authority on city planning, has reported to the Incorporated Society of Architects and Engineers on the revision of the principles of town and city planning formulated by that society in 1879. These revised principles were unanimously accepted by the society. For the translation of these, and of Prof. Baumeister's explanatory notes, we are indebted to Mr. Frank R. Durham and *The Surveyor*.

General.—In the planning and laying out of towns and cities, esthetic, hygienic, social and economic principles should be considered individually and in combination. The esthetic principles include the architectonic treatment of space, landscape treatment to attain vista effects, and more especially regard for the preservation of monuments and maintenance of features of local and national interest.

This lays down the necessity of the collaboration of architects, engineers and surveyors in order to avoid one-sided and amateur designs, and likewise to direct the endeavors of the designers towards obtaining a general effect of expediency and beauty, rather than the individual treatment of a single architectural feature or small area. It recommends preserving existing buildings of architectural value and natural features, the incorporation of the same with suitable surroundings, but without neglecting the requirements of hygiene, social and political economy.

Provision for Future Extension.—All probable forms of traffic should be provided for, such as streets with rail tracks, bridle and cycle paths, footway communication, railways, waterways, and all works required for upkeep and cleansing. Railways should not be laid at street level, but should as a rule be designed either above or below ground. Certain streets or districts should be especially set apart for business and shop premises, factories, dwelling houses and villa quarters, in accordance with the local requirements. Likewise suitable plots should be reserved for the erection of public buildings and certain areas maintained as open spaces. As expedients to attain this subdivision into districts, adaptability of position, traffic facilities, size of building blocks, building by-laws and trade regulations can be named. The above principles demand that the designs should cover considerable areas, and certainly include immediate suburban districts in general planning, as well as provide for prospective districts.

Here is pointed out the importance of the planning and designing of town extensions to cover areas not only for the present needs, but also for the future. The design of small areas is to be distinctly deprecated on account of the difficulties which arise in providing for future requirements of traffic (railways, tram roads and main arteries for road traffic), and above all for systematic drainage. Further, the treatment and sub-division of areas into different zones for different purposes (dwelling, business, factory quarters, etc.) is highly recommended in order that the important questions of social economy can be fully coped with. Subdivisions of this kind are of service, as the requirements can be more easily accommodated.

Streets.—The street network should be treated in distinct reference to main arteries of thoroughfare and sec-

ondary streets. The design should above all include these main arteries, more especially in the consideration of direction, in the form of radial, circumscribing or diagonal roads, whereas only such secondary streets should be determined as the local conditions absolutely require. All subordinated side streets, such as dwelling streets, factory streets, footways or walks should only be laid out to meet the requirements of the immediate future or left to private enterprise to develop under the supervision and sanction of the controlling authorities. In as far as important economic reasons or traffic impediments do not arise, it is recommended in the design of new streets to utilize existing roads or ways, actual property boundaries and river or waterway banks, existing buildings of note and features of nature, as well as to consider the termination or interruption of long roads of equivalent importance, the conformity of the street to the irregularities of the ground, the avoidance of cuttings and hollow longitudinal sections. In this consideration the following questions will arise: Whether the streets should be straight or curved; whether the junction with another street should be at right or acute angles; whether a straight or a set-off crossing is to be preferred; and finally, whether and to what extent street corners are to be rounded off.

The breadth and the arrangement of the streets will depend on the traffic to be accommodated and the permissible height of the buildings. For main arteries a considerable breadth is preferable, and under certain conditions can be provided for by means of front gardens, either public or private, which can be dispensed with in the future when widenings are required. For secondary streets lesser breadths are sufficient, and front gardens can be prescribed where tall houses, avenues or villa quarters are designed. In the further subdivision of streets multiplicity of variety is desirable, and is obtainable by change of direction and a symmetrical arrangement of the front gardens and tree rows. As minimum street breadths the following dimensions should be accepted: For streets of secondary traffic requirements 26 feet, with tram lines 56 feet, with a middle boulevard 82 feet, and the space between tree rows and the building line should be at least 26 feet.

The main arteries will generally follow the existing principal roadways. The circumscribing or "ring" roads will help to decentralize and develop suburbs, by affording them an easy means of intercommunication. It is not necessary to plan all the subordinate side streets, as their requirements will develop gradually with the extension of building, but the fixing of the general lines (the main arteries and secondary streets) will materially assist in the creation of a beautiful and well laid out town. In this consideration it is a matter of highest importance that the city authorities should decide how far and to what extent such plans should be published in order to keep under control land and building speculation. In designing a street the question of straight or curve alignment will depend considerably on the object to be attained. A straight street will sometimes give an open view to a fine vista, whereas a curved street will be more applicable to the contour of the ground.

Open Spaces, Squares, Etc.—Open spaces should be amply provided, but only few will require to be of an extensive nature. In accordance with the ultimate purpose and in proportion to the relative importance of such spaces the following rules should be observed, viz.: The

plan of the open space and the positions of the streets entering should be so chosen that the main traffic lines are kept to the sides, or, if not, be distributed as much as possible over the whole area, but on no account be directed towards a central crossing or the middle of the space. The immediate surroundings of open spaces should be preferably close built, while street entrances may be treated as gateways or arched. The surfaces of open spaces may be graded or sloped and the central area sunk or hollowed. The sites for public buildings or monuments require the following considerations: The possible raised position, the correct length of vision (two or three times the height), the effective view from the distance or the surprise effect due to proximity, and the completed background. Plantations in the immediate neighborhood of important architectural features should, as a rule, be laid out regularly and geometrically, but if they are of an extensive character and planned for a distinct purpose in the neighborhood of ordinary buildings a free picturesque treatment is preferable. A transition from the one style of plantation to the other, or a combination of both, will sometimes be appropriate.

In laying out open spaces it is not necessary, and even disadvantageous, to give them too considerable areas. Numerous small open spaces are to be preferred to a few large ones. Such small spaces can be easily obtained by simple street widenings. Such open spaces should be considered as regards their purpose, whether as traffic centers, gardens, or for the erection of monumental buildings and monuments. In the treatment of the latter it should be carefully considered whether such structures should form a part of a view, as seen from a distance, or whether they should come as a surprise on turning a corner.

Planning and Class of Buildings.—Of three classes of dwelling houses, self-contained houses containing two to four flats and large tenement blocks, the two former should be encouraged, whereas the last must be only permitted within the older parts of the town with restrictions of their defects, and should be condemned in new districts. Limitations of areas and heights of buildings must be legally prescribed not only from the hygienic but also from the economic point of view. Regulations in this respect should be differentiated in the case of a large city or town, either according to districts or zones, or certain subdivisions of area, or to particular streets and roads. This differentiation should be treated partly in respect to the actual ground value, and partly with a view to the class of buildings required. Adequate depths for the plots of dwelling houses, business premises and combined business and dwelling houses should be adjusted in consideration of height covered, court and garden areas, and for small buildings should be 50 feet to 100 feet, medium size buildings 80 feet to 165 feet, and large structures 130 feet to 230 feet, and for factories more especially, the distance between road and railway or road and waterway 195 feet to 330 feet. The so-called open building (detached) is suitable for small houses, as well as for larger types of buildings, more especially in the villa districts, but not for business quarters. The correct space should be proportionate to the height of the buildings. Hygienic and esthetic advantages of detached buildings can be to a certain degree attained by semi-open building (semi-detached blocks con-

taining three or more houses, but not in a continuous row), and proportionately diminish the economic disadvantages. The reservation of a sufficient proportion of air space within an area surrounded by continuous blocks will serve the same purposes as open building. This same regulation is to be recommended in the case of the reservation of a public garden or courtyard within the area of blocks of buildings. Back houses should be as far as possible avoided, and in preference intermediary streets should be constructed. It is often advantageous to place the building line 1 foot 8 inches to 6 feet 6 inches behind the street line in order to create a variety of offsets without prescribing front gardens. Further, the voluntary set-back of the house is permissible with due consideration to the neighboring houses. The two lines (building line and street line) need not lie parallel in such cases.

The self-contained house and the tenement house form the two extremes of dwellings. The ideal self-contained house will not be attainable everywhere from economic reasons, and therefore the house containing two to four flats will form the means of the two extremes. Tenement houses, which are undoubtedly both hygienically and morally the worst form of dwellings, are to be condemned, but the erection of such tenement blocks will sometimes have to be permitted out of economic principles where the ground values are extremely high, with a limitation as to the number of dwellings allowed to be contained therein. The open building has a great number of advantages, more especially free air circulation and light, as well as the avoidance of ugly party walls during the development of a city area. The main disadvantages are the greater expense and the extravagance of frontage required, but these disadvantages may often, in the case of large dwelling houses, be outweighed by the accruing advantages. Smaller houses cannot be treated thus on account of the economic standpoint. The semi-open building or groups of houses incorporate to a certain extent the above advantages, and are distinctly more economic structures. In the case of continuous building the free circulation of air is of greatest importance, and therefore the open spaces behind the rows of buildings should be a first consideration, and when back houses have to be permitted their height should be limited to less than that of the front buildings, and perhaps even prohibited as dwelling houses.

Town Plans.—The rights of expropriation of municipal corporations and bodies should extend over all private properties which the planning and laying out of town or city require for the welfare of the community. Legal assistance should be granted to afford relief in the form of expropriation and compulsory incorporation of fractions of plots resulting from the laying out of streets, compulsory powers to reconstruct unbuilt upon plots whose form impedes development, and further expropriation rights over districts to meet the requirements of hygiene and the demands of traffic. After the plan has been legally sanctioned, such areas as are required for public streets and open spaces may not be built upon, or if built upon are to be subject to the removal of the building. The cession of properties can be demanded by municipal bodies at such times as suits their convenience. Municipal bodies should be bound to construct a street as soon as the general demand for houses requires it, and certainly when the erection of houses covering half the length of the adjoining frontages is secured, as well as taking over under the same conditions any street constructed by private enterprise. Special by-laws should be framed for isolated buildings which lie beyond the existing alignment, more especially in reference to approach and drainage; at the same time such isolated buildings

can be limited to certain purposes—factories, villas, self-contained houses or otherwise.

To create a really satisfactory town plan far-reaching expropriation rights are necessary. In order to avoid the cutting up of plots requiring heavy compensation, it will often be found more advisable for the municipality to acquire the whole of such plots, or have some powers to attain the incorporation of such fragments with neighboring plots, such as a redistribution and division. All powers should be brought to bear in order to prevent isolated and planless building lying beyond the existing alignments, and strict by-laws regulating such buildings should be drawn up in order to ensure proper approach, drainage, etc.

Regulation of Cost.—In the calculation of the contributions to the actual cost of construction of a new street which the adjacent proprietors have to pay, the cost of ground purchase, leveling and construction, as well as drainage over the whole length of the projected street, should be summed up and proportionately divided. In case of a large district where uniform conditions exist fixed standard charges are to be recommended. Further, the outlay incurred for specially expensive objects should be proportionately divided between the immediate and the adjacent landowners who derive benefit from the same. In the division of cost between the individual adjacent proprietors, the frontage of the plot, as well as the type of building, including the area built upon and capable of being built upon, as well as the number of stories, should be taken into consideration. The municipal authorities should have the powers to diminish these contributions when the buildings projected (workmen's dwellings, etc.) are for the furtherance of public welfare. In this case certain by-laws should be framed in reference to the size and construction of such dwelling houses, in reference to the methods of letting or renting, and further in reference to the limitation of profits.

The expense of laying out new streets should be considered with regard to the ultimate success accruing from the development, the enhanced value and the increased utility of the ground to the proprietors. The most usual form of assessment for land value is made on the frontage, and in some cases the length of frontage liable has been limited from 45 to 85 feet. The most satisfactory method is the adoption of fixed standard charges. Often the erection of public works, such as bridges, laying out of parks, flood works, etc., will increase the value of property, and therefore the cost of such works should be partly borne by all those landowners who derive direct benefit. Regulations of this kind already exist in many cities. The cost of street construction should likewise be borne by the individual proprietor. These contributions are generally calculated on frontage, but it would be more fair to take into consideration the building erected thereon in consideration of the frontage, number of stories, cubic contents, and number and size of dwellings. It is a question whether it is right to assess these contributions on the actual value of the ground when originally laid out or on the enhanced value resulting from the construction of the new streets. With regard to the erection of workmen's dwellings and such like, it may be to the advantage of the municipality to allow certain leniency in the case of contributions in order to relieve the

demand for such dwellings. Whether such concessions should be made to private companies, building societies or private speculators is a matter for careful consideration, not only from the technical but also from the economical point of view.

SHEET ASPHALT SPECIFICATIONS

The Latest Prepared for Washington, D. C., by the Department's Experts—Materials, Mixtures and Methods of Laying Specified

ONE of the latest and best specifications for sheet asphalt paving are those prepared in 1906 by the Engineer Commissioner of the District of Columbia for work in the District. Omitting the ordinary requirements as to method of bidding, conducting work, etc., and grading, these are substantially as follows:

The sub-grade, after being trimmed so as to be parallel to the surface of the pavement when completed, will be thoroughly compacted by rolling with a roller weighing not less than five tons and by heavy ramming at places which cannot be reached by the roller, dampening the bed before rolling and ramming, if required, to the satisfaction of the engineer.

Upon the bed thus prepared there will be laid a 6-inch foundation of concrete made of the following materials: One part by volume Portland cement, 4 parts sand, 5 parts gravel and 5 parts stone. Broken stone, run of the crusher, may be substituted for part or all of the gravel, at the option of the contractor.

The cement must meet the ordinary requirements; must be kept for testing at least ten days before use, and twenty-eight may be demanded; and, if at any time this requirement would cause delay for want of approved cement, the contractor must purchase the necessary amount from the District at \$2.50 per barrel. The sand must be of various sized grains and not contain more than 5 per cent. by volume of silt. The stone must be smaller than 2 inches and larger than $\frac{1}{2}$ inch; must be screened and washed on demand. No gravel pebble shall have a dimension greater than $1\frac{1}{2}$ inches. Cement and sand to be mixed dry six times; then, after adding wet stone, the whole to be turned over four times.

The specifications for the asphalt paving proper are given in full:

Binder.—The binder course shall be composed of clean, broken stone, equal in quality to the stone for the base, and passing an inch and a quarter screen. Eighty-five per cent. of this shall pass said screen in its longest dimensions, and of the remaining 15 per cent. no piece shall have a larger dimension than 2 inches, and the stone, after passing the heating drums, shall not contain less than 5 nor more than 15 per cent. of material passing a No. 10 screen.

The stone will be heated not higher than 350 degrees F., in suitable appliances. It is then to be thoroughly

mixed by machinery with asphalt cement, such as is acceptable for surface cement, penetrations 60 to 90, at such temperature and in such proportions that the resulting binder will have life and gloss without an excess of cement. Should it appear dull from overheating or lack of cement, it will be rejected. While hot it will be hauled upon the work, spread upon the base so that when compacted it will be at least $1\frac{1}{2}$ inches in thickness, and immediately rammed and rolled until it is cold. Should the resulting course not show a proper bond, it shall be immediately removed and replaced by the contractor. Binder and top shall not be taken from the yard to the site of the work when weather conditions are, in the judgment of the engineer, unsuitable for the work of laying the pavement.

The contractor shall not enter upon a concrete base in order to lay the binder course until it has obtained sufficient strength for such a purpose, and during the period between laying the base and binder he shall properly protect it, and, when ordered by the engineer commissioner, shall sprinkle it in warm weather between the hours of sunset and sunrise as often as may be deemed necessary, and in cold weather cover it with a material suitable for its protection.

Asphalt wearing surface.—The wearing surface of the pavement shall be composed of asphalt cement; clean, sharp-grained sand; fine absorbent mineral dust.

Asphalt cement.—The asphaltic cement must be practically free from water, and must be within the range of 40 and 70 penetration when tested at 77 degrees F. The amount of penetration to be fixed by the engineer commissioner.

Preference will be given to an asphaltic cement that is not readily affected by the action of water, provided it is satisfactory in other respects. If an asphaltic cement is accepted that is affected by water, some provision satisfactory to the engineer commissioner must be made to guard against the result of such action, and such work must be included in the price bid.

If an asphalt has been proposed for use by the contractor and approved by the engineer commissioner, no change in the asphalt to be used shall be made unless with the approval of the engineer commissioner. If an asphalt is submitted for use which has not been successfully used for a period of at least two years for paving under conditions similar to those existing in the District of Columbia, its use may be limited to such extent as may be deemed advisable, or it may be rejected for use entirely in the discretion of the engineer commissioner.

The bitumen of the asphaltic cement must comply with the following tests:

1. It must be of such a character that if, when tested at 32 degrees F., it shows a hardness of 10 penetration, it must not, when tested at 115 degrees F., be softer than 350 penetration.

2. When a briquette of the pure bitumen having a minimum cross section of 1 square centimeter is tested for ductility at 77 degrees, the bitumen must stretch to a distance of 8 centimeters before breaking.

3. When the bitumen is heated in an open tin at a temperature of 300 degrees F. for eighteen hours in a hot-air oven, it must not show a loss by volatilization of over 5 per cent., and it must not have been hardened over 50 per cent. by this heating.

The asphaltic cement must never be heated to a temperature that will injure it.

When the asphaltic cement contains over 5 per cent. of material that will separate by subsidence while in a molten condition, it must be thoroughly agitated before drawing from storage and while in use in the supply kettles so as to insure a uniform cement.

These properties shall be determined by tests made by uniform methods, descriptions of which are on file in the office of the engineer commissioner.

Sand.—The sand in use shall be hard grained and moderately sharp. On sifting it should have at least 15 per cent. of material that would be caught on a 40 mesh per inch screen, 25 per cent. of material that will pass an 80 mesh to the inch screen, 10 per cent. of which at least must pass a 100 mesh to the inch screen. If the sand to be used does not contain the desired fine material, mineral dust can be added to make up the deficiency, and in any case at least 5 per cent. of such mineral dust shall be used. The amount of fine material may be diminished on streets of light traffic when approved by the engineer commissioner.

Mineral dust.—This shall be any fine, absorbent, inorganic dust not acted upon by water, the whole of which shall pass a 30-mesh screen, and at least 75 per cent pass a 100-mesh screen.

Asphalt paving mixture.—The materials complying with the above specifications shall be mixed in proportion by weight, depending upon their character, and the traffic on the street, and upon the character of the asphalt, and will be determined by the engineer commissioner, but the percentage of bitumen in any mixture soluble in carbon bisulphide shall not exceed the limits 9 to 13 per cent. If the proportions of the mixture are varied in any manner from those specified, the mixture will be condemned, its use will not be permitted, and, if already placed on the streets, it will be removed and replaced by proper materials at the expense of the contractor.

The sand, or mixture of sand and stone dust, and the asphaltic cement will be heated separately to about 300 degrees F. The dust, if limestone, will be mixed while cold with the hot sand in the required proportions, and then mixed with the asphaltic cement at the required temperature, and in proper proportion in a suitable apparatus, so as to effect a thoroughly homogeneous mixture. Sand boxes and asphalt gages will be weighed in the presence of inspectors as often as may be desired.

The pavement mixture prepared in a manner thus indicated will be brought to the ground in carts at a temperature of not less than 250 degrees or more than 350 degrees F., and if the temperature of the air is less than 60 degrees F., the contractor must provide canvas covers for use in transit. It will then be thoroughly spread to a thickness of at least $2\frac{1}{2}$ inches by means of hot iron

rakes, in such manner as to give uniform and regular grade, so that, after having received its ultimate compression, it will have a net thickness of at least $1\frac{1}{2}$ inches. This depth will be constantly tested by means of gages furnished by the engineer commissioner. The surface will then be compressed by hand rollers, after which a small amount of hydraulic cement will be swept over it, and it will then be thoroughly compressed by a steam roller weighing not less than 175 pounds to the inch, the rolling being continued for not less than five hours for every 1,000 yards of surface.

Asphalt base.—In resurfacing work where the depth of binder would be excessive, an asphaltic or coal tar base, as directed, will be first laid. It will be composed of clean broken stone, free from spalls, that will pass through a 3-inch ring, well rammed, and rolled with a steam roller weighing not less than five tons. The rolling will be continued until the stone ceases to creep before the roller, and until it is evident that the final compression has been reached. It will then be thoroughly coated with asphaltic paving cement or coal tar of approved quality, as directed.

The contractor is required to guarantee the paving and keep it in repair without cost to the District for a period of five years from the date of its acceptance. Ten per cent. is retained for the purpose of maintaining the work in repair and making good any defects during the guarantee period, in case the contractor fails to do so after notice to that effect.

Hydrant Rates in California

At the ninth annual convention of the League of California Municipalities a considerable number of the cities of the State, in response to a question by a delegate, stated the charges made by the various water companies for hydrants and street sprinkling. Alameda pays \$1 per month per hydrant, including sprinkling. Alhambra, 4 cents per tank for sprinkling, \$40 per year for fire hydrants. Berkeley, \$2.50 per year for fire hydrants. Chico, for sprinkling, 1 cent per 100 gallons; for fire hydrants and cisterns, \$6 per year each. Hanford, 5 cents a thousand gallons for sprinkling. Los Gatos, \$5 each per year for fire hydrants, 10 cents per thousand gallons for sprinkling. Merced, \$70 a month for sprinkling. Pasadena, 6 cents per thousand gallons for sprinkling; no hydrant rental. Paso Robles, 10 cents a thousand gallons for sprinkling, etc.; no hydrant rental. Petaluma, fire hydrants, \$60 each per year. Pomona, \$2.40 per year for each fire hydrant, 8 cents per thousand gallons for flushing. Richmond, \$24 per year for each fire hydrant, 15 cents per thousand gallons for sprinkling. San Jose, 10 cents per thousand gallons for sprinkling, fire hydrants \$6 per year each. San Leandro, \$20 per year for each fire hydrant, 17 cents per thousand gallons for water. San Mateo, 25 cents per thousand gallons for sprinkling, etc., \$1.20 per month for each fire hydrant (hydrants furnished by city). Stockton, 7 cents a thousand gallons for water. St. Helena, \$30 a year per hydrant, 15 cents a thousand gallons for sprinkling.

WATERWORKS OF MUSKOGEE, I. T.

Mechanical Filtration Plant—Difficult Work in a Submerged River Crossing—Reinforced Concrete Settling Basins and Filters

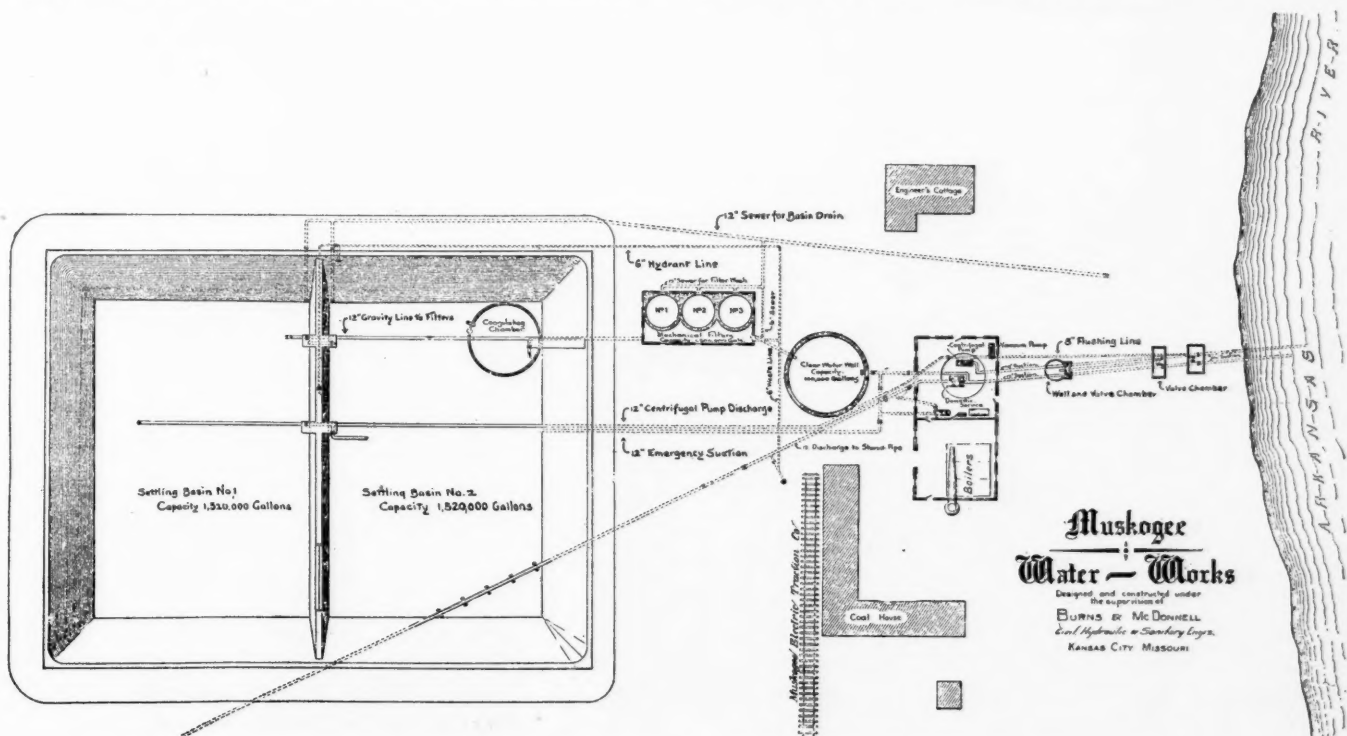
THE original water works plant at Muskogee, I. T., was built in 1904, when the population was about 5,000. Bonds were authorized by a special act of Congress to pay for the system. In the three years which have followed the town has grown from 5,000 population to a city of approximately 25,000, and this rapid increase of population has made improvements necessary each year since the original plant was completed.

The water of the Arkansas river, on which Muskogee is situated, is impregnated with salt and gypsum, probably due to flowing over the gypsum beds in western Kansas, and has such a brackish taste as to be very undesirable for domestic use. Emptying into the Arkansas river, but approaching from the side opposite Muskogee, is the Grand river, whose water is of much better quality. For this reason it was thought desirable to cross the Arkansas river and obtain the water supply from the Grand river, which is a water of exceptional purity, except in rainy seasons, when it carries large amounts of sediment. The pumping plant is located five miles from Muskogee, on the west bank of the Arkansas river, and two independent sixteen-inch cast-iron suction lines are laid under the bed of the Arkansas river and extending for a half mile up into the mouth of the Grand river. These suction lines terminate at their upper ends at a concrete intake pier, located in the center of the deepest channel of the Grand river. They were laid on a temporary platform, built at low water, and were then gradually lowered into the water, a number of ball and socket

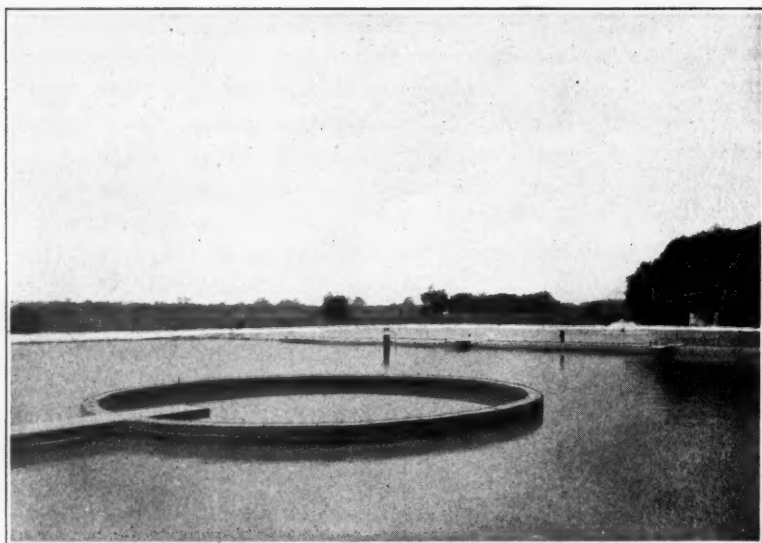
joints being used to allow for uneven settlement of the pipe lines on the gravel bed of the river. Trenches were dredged and scooped out in the gravel to permit the pipes to settle to a slate bed beneath the gravel, which had an average depth of about six feet. Where the pipe lines cross the main channel of the Arkansas river steel rods were driven into the slate bed on the down-stream side of the pipes. These rods were then bent over the pipes, securely anchoring them. Within a short time after the lines were in place, the swift current filled the trenches with sand and gravel, completely covering the pipe lines. The construction of this river crossing was one of particular difficulty. When bids were asked for about a dozen contractors submitted bids on all other parts of the work, but all declined to contract for the river crossing except one, the others claiming it would be impossible to lay 20-inch lines in a river where the difference between low and high-water stages is forty feet. Slight rains up the river cause very sudden rises, and at one time a rise of four feet in one hour caused the loss of cement, pile driver, engine, boiler, etc., which were in place on a temporary platform. The contract price for laying the two suction lines, exclusive of other work, was \$31,400.

PUMPING AND FILTER PLANT

Low-service steam-driven pumps of two and one-half million gallons capacity lift the water into two concrete-lined settling basins of three million gallons total capacity. The water is discharged into the west basin through an aerating device; it then flows over a concrete weir into the east basin, and thence into a circular brick coagulating chamber, where a coagulant of lime and sulphate of alumina is introduced into the water. It is estimated that about 80 per cent. of the sediment is deposited in the settling basins, which are arranged for convenient cleaning by wash pipes and waste pipes to the river. From the



GENERAL PLAN OF PUMPING STATION, SETTLING BASINS AND FILTERS, MUSKOGEE WATERWORKS



SETTLING BASIN, SHOWING COAGULATING CHAMBER

coagulating chamber the water flows to mechanical filters, arranged in one-half-million-gallon units, installed in a brick filter house. The filters are built of reinforced concrete, with mechanical stirring and cleaning devices arranged for cleaning every twenty-four hours, or oftener if necessary. From the filters the water flows to a concrete-lined, pure water reservoir. This reservoir is roofed to exclude dust, leaves and other dirt. From here the water flows by gravity to the high-service pump, which is a vertical duplex compound condensing engine of Worthington manufacture. This pump delivers the water to a stand-pipe of half a million gallons capacity, against a head of 300 feet. The standpipe is 125 feet high and 25 feet diameter, built on a masonry foundation extending to solid rock, and is located on a hill 50 feet above the business portion of the city. Very few standpipes of such large capacity have been built in the West. It is triple-riveted, with double-butt joints, the bottom ring being one inch in thickness.

The power plant consists of three 100-horsepower return tubular boilers, arranged in a battery with mechanical shaking and dumping grates. Coal is delivered to

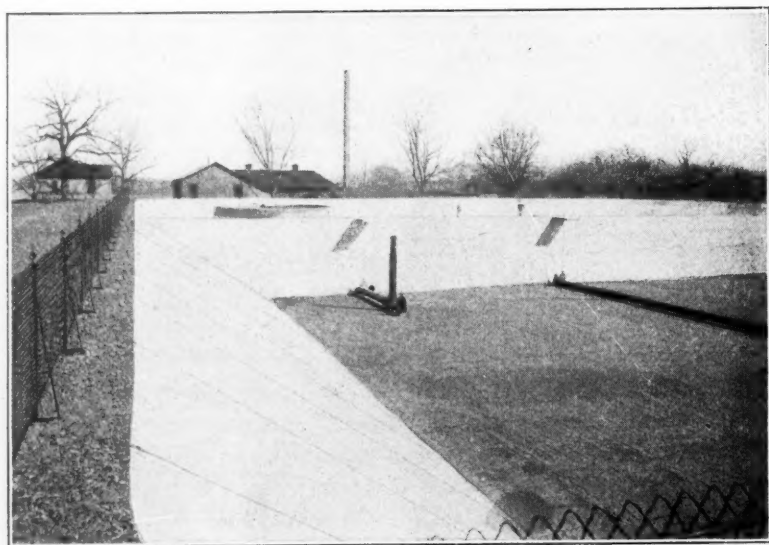
the plant in cars operated by the Interurban Electric car line, although natural gas or oil will probably be used as fuel in the near future, as there are now many producing wells within a few miles.

The power house and filter house are of red pressed brick with stone trimmings and concrete floors. Reinforced concrete construction was used in the division wall separating the two settling basins. Expansion joints in the concrete lining of the settling basins were used to prevent cracking from settlement, or contraction and expansion of the concrete. The joints were filled with a liquid asphalt mixture, prepared especially for the work by the American Asphaltum and Rubber Company, of Chicago.

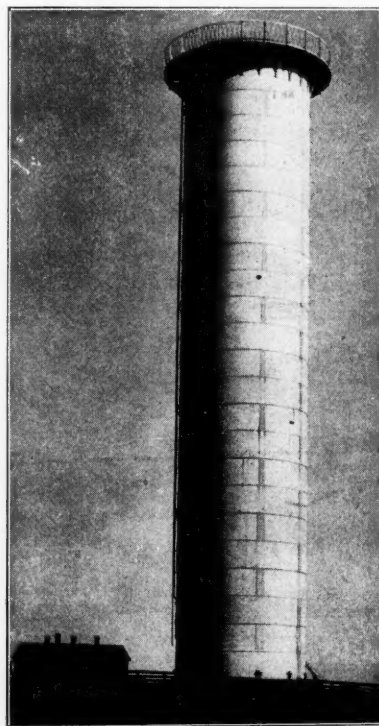
The pipe distribution system consists of about twenty-five miles of cast-iron mains from six-inch to sixteen-inch in size, and about 250 double-nozzle Corey fire hydrants, steamer hydrants being used in the business portion.

A well organized and thoroughly equipped fire department, operating from two separate stations, together with the excellent fire pressure, has prevented any disastrous fires, such as are often frequent among rapidly growing cities. Recent tests of the quality of the water show it to be of exceptional purity, and the plant is a marked example of what can be done to secure a satisfactory water by proper treatment of river waters.

The original construction work was done by Allan Black Company, of St. Paul, Minn., and the contract for the extension work and reservoirs was let to W. W. Cook & Son, of Junction City, Kansas. The standpipe was built by the Midland Bridge Company, of Kansas City, Mo., and the mechanical filter plant was furnished and installed by the Jackson Filter Company, of St. Louis, Mo.



CONCRETE LINING OF SETTLING BASIN, SHOWING EXPANSION JOINTS



STANDPIPE, 25X125 FEET

The entire plant was designed and supervised by Burns & McDonnell, Consulting Engineers, of Kansas City, Mo., with the exception of some subsequent extensions to the pipe system, which have been supervised by the City Engineer.

SPECIFICATIONS FOR CEMENT SIDEWALKS

THE Committee on Sidewalks, Streets and Floors (Geo. L. Stanley, Chairman) of the National Association of Cement Users presented a set of standard specifications for cement sidewalks at the convention in January, which would seem to be of sufficient interest to street superintendents to warrant their publication in full. Considering the hundreds of miles of cement sidewalks laid each year, there are few constructions for which it is more desirable that reliable standard specifications be prepared and enforced. The committee calls attention to the difficulty of preparing standard requirements for all sections, owing to variations in quality and size of materials available. "Gravel, of which the average size is one-fourth of an inch, requires at least one-fourth more cement than when the sizes are an average of one-half of an inch." Comparing walks laid with wet concrete and those with concrete which has been tamped, just enough water having been used to allow the air in both bottom and top coats to escape as the walk is tamped, they say, referring to taking up and relaying walks: "Tamped walks, where good, clean, sharp sand and gravel was used, have been found to re-lay and not show any defects, even after the walk had been in use seventeen years; but where an excess of water has been used the walks have been broken by frost, and often the top coats would separate from the bottom coat."

SPECIFICATIONS

Foundations

The ground base should be made as solid and permanent as possible. Where excavations or fills are made, all wood or other materials which will decompose should be removed and replaced with earth or other filling like the rest of the foundation.

Fills of clay or other material which will settle after heavy rains or deep freezing should be tamped solid in layers not more than six inches in thickness, so as to insure a solid embankment which will remain firm after the walk is laid.

Embankments should not be less than $2\frac{1}{2}$ feet wider than the walk which is to be built. When porous material, such as coal ashes, granulated slag or gravel, is used, under drains of agricultural tile should be laid to the curb drains or gutters, so as to prevent water accumulating and freezing under the walk and breaking the blocks.

The position of shade trees should not be less than 4 feet from the walk. Carolina poplar, elm or other shade trees, whose roots run near the surface of the ground, should not be less than ten feet from the walk.

Lines and grades should be given by a civil engineer; the stakes to be not over 25 feet apart, and far enough from the walk line so that an inspector may see that the walk is laid to line and grade.

The mold strips should be firmly blocked under the ends and the center of the strips and carefully straight-edged, care being taken that the strips are parallel with the engineer's line and the height of the grade stakes. The walks should be laid with a drop of one-fourth of an inch to the foot toward the curb gutter.

The thickness of the walk should be determined by the location, the amount of travel and danger of being broken by heavy bodies falling on it, or frost.

Business front walks should not be less than 4 inches thick, and can be 6 inches with profit. The top coat of business walks should not be less than $1\frac{1}{4}$ inches thick.

In residence districts the top coat should not be less than 1 inch wearing thickness, and the thickness for different widths of walks should be as follows:

Six feet wide, the minimum at the centers should be $4\frac{1}{2}$ inches thick. At the edges, 4 inches thick.

Five feet wide, the minimum at the centers should be $3\frac{3}{4}$ inches thick. At the edges, $3\frac{1}{2}$ inches thick.

Four and one-half feet wide, the minimum at the centers should be $3\frac{3}{4}$ inches thick. At the edges, $3\frac{1}{2}$ inches thick.

Four feet wide, the minimum at the centers should be $3\frac{1}{2}$ inches thick. At the edges, 3 inches thick.

All other widths, the minimum at the centers should be $3\frac{1}{2}$ inches thick. At the edges, 3 inches thick.

Size of blocks may be determined by the width and thickness of the walk. Business front walks should contain not over:

12 square feet when the walk is 4 inches thick.

16 square feet when the walk is 5 inches thick.

20 square feet when the walk is $5\frac{1}{2}$ inches thick.

25 square feet when the walk is 6 inches thick.

Residence districts where the walks are:

6 feet wide 5 inches thick at the center the blocks can be 6 feet long.

6 feet wide $4\frac{1}{2}$ inches thick at the center the blocks can be 5 feet long.

5 feet wide $4\frac{1}{2}$ inches thick at the center the blocks can be 5 feet long.

5 feet wide 4 inches thick at the center the blocks can be 5 feet long.

$4\frac{1}{2}$ feet wide 4 inches thick at the center the blocks can be $4\frac{1}{2}$ feet long.

4 feet wide 4 inches thick at the center the blocks can be 4 feet long.

4 feet wide $3\frac{1}{2}$ inches thick at the center the blocks can be 4 feet long.

Other widths less than the above, 4 inches thick at the center the blocks can be 4 feet long.

Other widths less than the above, $3\frac{1}{2}$ inches thick at the center the blocks can be $3\frac{1}{2}$ feet long.

Specifications for the Concrete

Bottom coat gravel. The largest size to be not over 1 inch, and all under $\frac{1}{8}$ -inch to be considered sand. Proportions to be one part high grade Portland cement to four parts clean hard gravel, and sand enough to fill the voids, which makes the proportions, as most gravel will measure, after being filled with sand, one part cement to five of the whole aggregate sand and gravel.

Bottom coat crushed stone. The size of broken stone should not be larger than $\frac{3}{4}$ -inch and vary in size to $\frac{1}{4}$ -inch and free from fine screenings and dust or soft stone. Proportions to be one part high grade Portland cement, two parts clean and sharp sand and four parts broken stone, or what is termed by consulting engineers and concrete experts as one cement to four of stone, and sand enough to fill the voids.

Mixing of both gravel and broken stone should be done by placing stone in the mixing box or on the platform first, then spread the sand evenly over the stone and in like manner the cement over the sand. Then cut through from top to bottom in thin slices, which will insure an even mix. Then turn with hoe or shovel twice before adding water, which should be done with a sprinkler and hoed over as sprinkled. The batch should be turned at least once after the water is applied. The amount of water used in the bottom coat should be only enough to make it, when firmly tamped, solid and not quaky.

Top coat. Proportions: Three parts high grade Portland cement and five parts clean sharp sand, mixed dry and screened through a No. 4 sieve. In the top coat the amount of water used should be just enough so that the surface of the walk can be tamped, struck off, floated and finished within twenty minutes after it is spread on the bottom coat, and when finished it should be solid and not quaky. An edger not less than one-inch radius should be used on the out edges of the walk.

Separation of the blocks should be done with a spud not over 6 inches wide and $\frac{1}{4}$ of an inch thick, and to insure complete separation the groove should cut through into the ground base. Fill the groove with dry sand, before the top coat is spread, and the top coat should be cut through to the sand, after floating and troweling, and a jointer run in the groove, then again draw a trowel through the groove, so as to insure a complete separation of the blocks.

The protection of newly finished walks from storms can be accomplished by covering with roofing paper or canvas. Canvas should never be laid on the walk, but stretched over on a slant so as to run the water off.

Grading, after the walks are ready for use, should be on the curb side of the walk $1\frac{1}{2}$ inches lower than the walk and not less than $\frac{1}{4}$ of an inch to the foot fall towards the curb or gutters. On the property side of the walk the ground should be graded back at least 2 feet and not lower than the walk, which will insure the frost throwing the walk alike on both sides.

THE DISPOSAL OF MUNICIPAL WASTE

Systems and Methods, with Special Reference to American Conditions—Consolidated Tables of Furnaces —The Reasons for Failures—Hygiene and Sanitation

By W. F. MORSE, Sanitary Engineer

This Series of articles, begun in the February, 1906, number, will be continued until completed and will be illustrated by original drawings, cuts, diagrams and pictures, and contain many tables valuable for reference.

The Subjects Already Treated by the Author Are:—

1. The Waste Collection Service in American Towns; Methods and Results.
2. Definition of Terms; Quantities; Proportions; Character of Waste in General.
3. Garbage; Analysis; Proportions; Values.
4. Dry Refuse and Rubbish; Quantities and Treatment.
5. Classification:—Commercial Values after Recovery.
6. The Refuse Utilization Stations in New York, Boston, Buffalo, and Brooklyn (illustrated).
7. Municipal Ashes; Analysis; Proportions; Values when Separated.
8. Ashes from Cremation of Garbage; Analysis and Values; Comparative Table.
9. Comparison of Ashes from English and American Cities; Cremation Means.
10. The Utilization of Municipal Waste in General; English and American Methods.
11. Commercial Values of Refuse and Ashes when Marketed and Manufactured.
12. The Analysis of Garbage; Tankage, Its Value (Special Tables).
13. The Garbage Disposal Plant, Cleveland, Ohio.
14. Street Sweepings; Fertilizing Value and Treatment.
15. Comparative Commercial Values of Waste.
16. Foreign Destructors; Special Chapter by an Eminent Authority.
17. The first Garbage Cremators.
18. Official Reports on Cremators.
19. Chronological List of American Crematories from 1885.
20. List of Government and Institutional Installations.
21. Consolidated Tables of Installations; Hygiene and Sanitation.

The Following Are to Appear:—

22. Types of Furnaces; the Operating American Furnaces (fully illustrated).
23. Calorific Value of Waste as Fuel (comparative table).
24. Reduction and Extraction Process Described and Illustrated; the Earlier and Later Methods.
25. American Methods; Col. Waring and His Successors.
26. Present Situation in This Country; Résumé.
27. Means for Improvement as Suggested by Several Investigators.
28. What May Be Expected of the Future.

Recapitulation of Previous Tables

Table XXXV contains in a condensed form the list of garbage furnaces, cremators, incinerators and destructors built for municipal and private waste disposal in the past twenty-two years in this country and in Canada.

The table is intended to show the work of the several builders in their different lines of construction, and the number of furnaces (using this term as descriptive of the various titles and forms) that have been in continuous service long enough to demonstrate their efficiency and durability. It also includes the number of those whose efforts for one reason or other have not met with success and whose apparatus have failed.

These three divisions of the table indicate the relative number of each class of installation by each of the builders, and convey an idea of the special adaptation of each furnace to an appropriate class of work.

The Municipal Installations

The difference between the municipal and the other constructions is very marked.

This difference is due largely to the fact that in the governmental and in the institutional work there has been evinced a clear knowledge of the character of the waste to be dealt with, definite specifications have been drawn up, rigid contract conditions exacted, and careful supervision made of the construction.

After erection there have been thorough tests or trials of the furnaces, and when accepted they have been operated under oversight of engineers in charge of government work, or of those in control of the machine equipment of the institutions.

Government furnaces cover a limited period, that from 1900 to date. Once established, however, their use has been almost without failure, removals being for reasons other than those of furnace construction or performance. But it must be held in mind that these government disposal plants are not called upon to do their work for long daily periods under exacting conditions; and also that they have a reserve capacity of one-half of their maximum rating, all of which tends to preserve the construction. As government officers do not report quantities destroyed or the cost of fuel, labor or repairs, there is no basis for comparison between the several types of furnaces at any point except the cost of the installation.

Successful Private Installations

Under the third division of the table are brought together all forms of construction that are not limited to the municipal or governmental.

Here there is a wide range covered, a remarkably successful use of every opportunity, and a gratifying absence of failure as compared with the larger and more ambitious forms.

These installations have not only been able to meet all the conditions imposed, but they have maintained and extended their usefulness and have established a reliable means for the destruction of every class of worthless matter.

This country has long been under the imputation of signal failure in methods and apparatus for the treatment of public wastes, perhaps a deserved reproach when we consider what has been done elsewhere on similar lines of public work. But this cannot be said to apply to cases of individual waste disposal in institutions, in manufacturing establishments and in private businesses.

We may be behind in the branch of municipal work, owing chiefly to causes and conditions peculiar to our country and which do not exist abroad, but we not only lead in the variety of small furnace designs and their adaptation to the special work required—we have a far larger number of them in use and they are fully as efficient and economical as any of their class built elsewhere.

It should be noted that this type of furnace construction does not follow any foreign pattern, but that it is the logical development along certain lines of the crude beginnings of twenty years ago, marking each difficult

TABLE XXXV. RECAPITULATION OF LISTS OF AMERICAN GARBAGE FURNACES

	NAME OF BUILDERS AND ADDRESS	TABLE XXXII MUNICIPAL			TABLE XXXIII GOVERNMENT			TABLE XXXIV INSTITUTIONAL			GRAND TOTAL		
		Operating	Discont'd	Total	Operating	Discont'd	Total	Operating	Discont'd	Total	Operating	Discont'd	Total
1	A. Engle & Engle-Thompson Co., Ia.	1	4	5							1	4	5
2	Engle San. & Crema'n Co., Ia.	9	16	25	1	1	2	12		12	22	17	39
3	Vivartas and Seaboard Co., N. Y.	1	4	5							1	4	5
4	A. Brownlee, Dallas, Texas.	1	5	6							1	5	6
5	Dixon Crematory Co., Toledo, O.	37	19	56	7	2	9	4		4	48	21	69
6	Chas. Thackeray, Montreal.	2		2							2		2
7	W. Swindell, Allegheny, Pa.	1		1							1		1
8	Jones, Toronto.	1		1							1		1
9	Jno. McKay, Yonkers, N. Y.	1		1							1		1
10	S. G. Brown, Belleville, N. J.	1	2	3							1	2	3
11	Decarie Mfg. Co., Minneapolis.	14	3	17				1		1	15	3	18
12	Davis Co., Lancaster, Pa.	5		5							5		5
13	Morse and Boulger, N. Y.	1		1	2		2	18		18	21		21
14	Morse-Boulger Co., N. Y.	3		3	6		6	34		34	43		43
15	Pearce-LaChappelle, Ill.	3	1	4							3	1	4
16	H. B. Smith, Bridgeport, Conn.	1	1	2							1	1	2
17	W. B. Wright, Chicago, Ill.	1		1				1		1	2		2
18	Municipal Engineering Co., N. Y.	1		1	7		7				8		8
19	H. de B. Parsons, N. Y.	2	1	3							2	1	3
20	F. P. Stearns, N. Y.	1		1							1		1
21	Amer. R. R. Traffic Co., Brooklyn	1		1							1		1
22	Geo. H. Pearson, Marion, Ohio.	3		3							3		3
23	Lewis & Kitchen, Chicago.	1		1	3		3				4		4
24	Meldrum Destructor Co., Eng.	1		1							1		1
25	Sanitary Eng. Co., N. Y.				3		3				3		3
26	Dr. I. S. Billings, Baltimore.							1		1	1		1
27	Weislogel Co., Vincennes, Ind.	1		1							1		1
28	Heenan & Proude, Eng.	1		1							1		1
29	25 Other Builders.		32	32		1	1					33	33
53	Totals.	95	88	183	29	4	33	71		71	195	92	287

progressive step by improved apparatus and better results. Within a well-defined and limited field of work the furnaces have been uniformly successful.

Reasons for Municipal Failures

The large percentage of failures of installations for municipal work has previously been briefly noted.

Of one hundred and eighty-three, the whole number built and here reported, eighty-eight, or 45.4 per cent., have been discontinued and abandoned. On the other hand, only 3.4 per cent. of the total number of one hundred and four furnaces built for government or private use have failed of continuance. The reasons for this striking difference may be thus stated:

1. A lack of professional knowledge necessary for the accurate analysis of the character of the various kinds of waste, and in lieu of this information the estimate of quantities and qualities by guesswork, without a definite standard for reference and comparison.

2. The want of sound engineering knowledge of the principles of combustion, heat and resulting gases; mistakes in estimating the proper dimensions and proportions of the working parts of the installation, and from lack of scientific training and the inability to remedy defects or correct errors.

3. Faults in design and construction arising from an apparent disinclination to profit by the experience of others, leading to a repetition of futile experiments and forms of construction tried elsewhere and abandoned.

4. An overconfident opinion that a machine or process

that deals successfully with certain kinds of raw material will produce equally good results from municipal waste.

Because a rotary furnace will roast ores it does not follow that it will burn garbage successfully. This has often been tried and failed.

5. The unskillful management of garbage crematories by men appointed for reasons other than their fitness for the work. This is forcibly stated by an authority as follows:

"The expert garbage fireman who is considered essential to success in England is generally supplanted here by a man whose only qualification for this position may be that he can shovel coal or pull out clinker, but generally has not the remotest knowledge or even conception of the difficulties of burning on a large scale the most heterogeneous mass of all forms of solid matter to be gathered from a modern community." (Transactions of Am. Soc. Civil Engineers, Vol. XXIX, p. 82.)

6. There are too few official reports that give quantities, costs and other details to show what is being done from year to year, thereby enabling the authorities to correct errors and improve the service. These reports, if truthful and complete, would soon fix the responsibility for bad apparatus and poor management, and would, moreover, be of great assistance to other communities seeking information. But the truth should be told without fear or favor, or there will be a misrepresentation of conditions and a perpetuation of errors.

The Share of Municipal Responsibility

The responsibility for failures is not all on the side of the designer or builder. The municipal authorities are themselves a large factor of uncertainty in the general result.

When the nuisance of incompetent waste disposal—or the want of any—becomes plainly evident, and the protests of the people are loudly insistent, the matter is referred to a committee with instructions to obtain information, examine and report. Details are asked for, and straightaway a great bulk of pamphlets, plans, reports, schemes and suggestions from all sorts of interested parties are submitted. To deal with this mass of conflicting detail and to reduce it to any sort of intelligent order and formulate a report demands more technical knowledge and time than the average official can give. The town officers and employees who are competent to give assistance have their own departments of duty and are not always available, or, if so, suitable, for practical help in this preliminary stage. They are, moreover, not anxious to offer advice or suggestions upon a subject with which they have had little or no experience, and certainly no technical training.

The inspection of plants operating under conditions like their own, in towns of similar size, seems to be considered a necessary part of the preliminary work as it is conducted at present. Junketing excursions to distant places must be made at some one's expense. For town officials it is part of the "perquisites of office"; to a prospective builder who pays traveling expenses it is an investment for a purpose and sometimes returns to him with compound interest.

When the specifications are to be issued for bids the uncertainty as to just what is really needed makes it impossible to state definite terms and conditions. Usually it is left for open proposals from all interested parties, frequently ending with the rejection of all, and the process is repeated until a choice is at last made.

The methods that sometimes determine this final selection do not always procure the best results for the town. One writer has expressed himself clearly on these questions:*

"It should in justice to the builders of municipal plants be added that the fault of most failures lies at the door of the municipal authorities, on one or another of the following scores: Acceptance of an untried installation designed by some local party without substantial experience or attainment in this line of work. Contracting in good faith for an unsuitable installation, because of ignorance by the purchaser of what the conditions to be met really are. Determination by the municipal authorities to award work to contractors who will pay the largest sum to those who have the power to determine who shall secure the contract.

"Unfortunately, in spite of the recent outcry against graft, the affairs of most American cities and towns are controlled by persons who either demand contributions

*"Garbage Crematories in America." W. M. Venable, N. Y., 1906. Jno. Wiley & Sons.

from public contractors for themselves or permit their subordinates to demand them in order to retain the services of those subordinates. ' So many and so various and subtle are the methods by which political prostitutes may cheat the people of money that few contractors and few engineers are able to withstand the pressure brought to bear upon them, if they seek to serve a public where the grafters are in control, or even in the minority, on the city council or other public body in control of the municipal administration."

This is a plain statement of facts which, though often difficult to prove, can still be well substantiated in many cases. There is probably no department of municipal service in which greater opportunities are afforded for doubtful and crooked work, and certainly none where it is so persistently and openly practised. It is not an attractive nor always an agreeable branch of work, but yet it is one that deserves more rigid attention and better treatment than is commonly given it.

The Share of Responsibility of the Advisory Boards

Not all the blame for mismanagement and incompetency in disposal work should attach to the financial and executive departments.

The advisory boards of health, whose province should be strictly limited to investigation, report and advice on matters that concern public hygiene, are frequently placed in positions that require them to select and install apparatus with which they are either unacquainted or in the purchase of which they may be personally interested.

While the physician is recognized as the authority upon questions that concern the prevention, discovery and treatment of disease, whether of the individual or of the community, there is a distinction to be made between that which relates to the professional and medical side of the subject and that which applies to the mechanical and physical side.

Hygiene in its widest sense is "the science that treats of the preservation of health," and this term includes sanitation as the means of specific, well-defined method of health preservation.

Undoubtedly the whole general question can be dealt with by the medical fraternity, but in a municipal administration there should be separation of the advisory and executive branches of the Health Department, as each phase of the subject requires technical education and special training in order to achieve the best results.

What is Hygiene and What Sanitation

This difference has been well defined by an eminent authority, whose services in both branches are well known:*

"The sphere of hygiene is naturally separable into two distinct hemispheres, one dealing directly and chiefly with individuals or masses of individuals, the other directly and chiefly with their environment. . . . In spite of its admitted importance, hygiene occupies only a very small place in our medical schools, partly, I believe, because *sanitation* has become so large a part of

*Prof. W. T. Sedgwick, "Contributions from Sanitary Research Laboratory," Vol. III. Mass. Institute of Technology.

hygiene, and sanitation belongs in schools of engineering. . . . It is to-day absurd for the average well-trained medical student to think of becoming an expert in such branches of hygiene as water supply, sewerage, heating and ventilation, street building, cleaning and watering, garbage collection and disposal, gas and other forms of light, ice supply, milk supply, the abatement of nuisances, etc. These belong rather to the sanitary engineer, sanitary chemist and sanitary biologist; to sanitation rather than hygiene. . . . As for research, it is idle to expect the ordinary medical man to spend much time upon or to be greatly interested in the detailed problems of water or sewerage purification, even if he has—as he generally has not—the requisite training."

An Engineering Problem

Briefly, then, sanitation as concerned with waste disposal is an engineering problem, and the difficulties encountered can best be overcome when competent engineers are employed for the special purpose.

As compared with the usual way of conducting this work, the engineer has many advantages that can be hardly overestimated. An examination made by a competent man, trained in this special line of municipal work, would proceed on these lines:

The review of the municipal records—if there were any—of the past, to know what has been done, and the preparation of a clear and concise tabulation of this as a basis for future work, is only the beginning. Then comes a careful study of reports, papers and writings on this subject that may bear upon this particular case. It must be remembered there is but little reliable literature on this subject, foreign experience does not always agree with our local conditions, and a good deal of ground must be covered with relatively poor returns.

Later the investigation of the various methods available is taken up, and here the technical training in fundamental principles that underlie the many schemes, plans, processes and systems is absolutely essential. He must be able to distinguish between the true and the false, and to be proof against the plausible arguments, misrepresentations and appeals brought to bear through personal, political and financial pressure. When all this is finally threshed out, and a well-defined plan or policy fixed upon, the report is drawn up and the specifications prepared, which eliminate the weak, crude, impracticable and vicious elements and state clearly what the town desires to obtain and what conditions the tenders must conform to; and this final report, with the diagrams and plans, is submitted for action.

The responsibility is thereafter upon the town authorities. They have before them a clear and accurate report, that covers every phase of the question they must decide upon and which is unbiased and unpartisan and presumed to be unconnected with any local clique or party, and not in the interest of any particular builder, machine, apparatus or process. The actual expense connected with this work is usually less than would be incurred by the present method of united or separate per-

sonal investigation by the members of a committee of the Council or Board of Health.

The Interest of Boards of Trade

This means of arriving at the facts is often undertaken by the Boards of Trade, the Citizens' Business League, or other local associations that act independent of the local authorities, and submit the results of their efforts in the form of recommendations or resolutions for consideration of the city council.

The Woman's Societies and Improvement Leagues often take a prominent part in these movements for better conditions of cleanliness, health and civic improvements, and especially in the control and abatement of nuisances, too often overlooked and ignored by the town officers.

The effect of this concerted action of these representative bodies of leading citizens, whose purpose is the good of the town generally and not the building up of a political machine, or the promotion of private interests, is always for the betterment of the civic welfare. When their remonstrances, protests and petitions are presented in a clear, forcible and intelligent manner, they sometimes carry greater weight and are productive of greater benefit than the half-hearted, hesitating and spineless official measures of the town authorities.

Public sentiment is the power behind the throne, and when this is fairly interested in behalf of a movement there is apt to be surprising results.

No Seat, No Fare

EDITOR MUNICIPAL JOURNAL AND ENGINEER,
Flatiron Building, New York:

DEAR SIR:—In the February 13 issue of the MUNICIPAL JOURNAL is an editorial with the above title, which neglects one of the principal sides of the question. For one, I hope that the ordinance put through by Mayor Mark M. Fagan, of Jersey City, N. J., will prove legal. If Chicago had such ordinances it would not have been horrified by the crowd pushing a young girl off the platform of the elevated, as was the case a few weeks ago, she being dashed to instant death on the pavement below. It is a good thing that Mayor Fagan's ordinance is bold enough to despise that "important factor of human nature found in the United States" when it is a question of the safety of life and limb, and the "American on his way to business" must be taught that he has no right to "take the first car available, whether full or empty," regardless of the rights of his fellows. I say he must be taught this, even by the use of force, if necessary, and any decent person will need only one glimpse of the football scrimmage at the Manhattan entrance to Brooklyn Bridge between the hours of 5 and 7 P.M. to convince him that the man who thinks his little time is so precious that he is justified in shoving women and children head over heels in his wild rush to "take the first car available, whether full or empty," should be straight-away put under arrest and conducted to the Tombs. If this noble citizen is then given to understand that he cannot do just as he pleases in taking cars provided for the use of all, he will get behind a public opinion to see that the terminal facilities are made suitable for handling as many cars as are needed to handle the people in an ordinary and comfortable manner. The transit companies make big profits for the fares they get, and they are amply able to furnish proper facilities for handling people in at least a safe manner, if they are *compelled* to do so. The only practicable way to compel them is to let them understand that the revenues will decrease in just the proportion that they fail to meet their obligations to provide properly for the handling of the passenger traffic. When the companies understand this, we shall have right transportation, as it were in a night, and we cannot have it before. It may be that Mayor Fagan's ordinance is about fifty years in advance of the times and that we shall have to go on letting people be maimed, and even killed, in place of compelling the companies to do what their franchises call on them to do, i.e., transport the people in a proper manner for an adequate compensation. Let other such ordinances be forthcoming and we shall see better things.

E. S. HAWKINS,
4009 Lake Ave., Chicago, Ill.

NEWS OF THE MUNICIPALITIES

Divers Subjects of General Interest and Their Treatment by City Councils and Officials—Streets, Waterworks, Lighting and Sanitary Matters—Police and Fire Items—Government and Finance

Roads and Pavements

CHATTANOOGA, TENN.—That the city of Chattanooga does not sprinkle the streets for the benefit of its citizens, but only sprinkles certain streets to preserve the paving, was the substance of a statement made by Harry Van Dusen, chairman of the Board of Public Works. The streets which are sprinkled at the expense of the city are those paved with chert, because a chert roadway would soon be ruined if allowed to remain dry. This statement was made on behalf of the Board of Public Works for the information of those who were besieging the city with communications and petitions asking that certain streets be sprinkled. Permissions have been granted to residents along certain streets to employ a sprinkling company, but under no consideration will the board expend money to do this work unless it is for the preservation of a chert roadway.

DALLAS, TEX.—The Charter Committee of Council has prepared the section of the charter providing for street improvements. As the matter stands, a bonded indebtedness for this purpose may be created to the amount of \$1,500,000, but not more than one-tenth of that sum is to be issued in any one year. This loan is for the purpose of carrying property owners who are allowed to pay in ten annual installments. Proceedings leading to the paving of a street may be initiated by the property owners or by the commission. In case of a petition, two-thirds may decide the kind of paving to be used. They may, however, in their petition fix a limit to the price which they wish to pay for the pavement they designate. The Commissioners may order a street to be paved and select the material it is to be paved with. They may assess two-thirds of the cost of the improvement on the abutting property if they see fit. In each instance a public hearing will be given at which complaints may be made in regard to an assessment.

DETROIT, MICH.—The Committee on Ordinances has reported favorably upon a bill designed to prevent "the acquirement of title by adverse possession in streets, avenues, alleys or other public places." In support of its recommendation the committee said: "Innumerable instances have arisen where property owners have obtained title to parts of streets and alleys by adverse possession, reference being made in particular to Broadway (formerly Miami avenue), where the city, by reason of neglect, eventually vacated to the abutting owners 9½ feet of the street in order to establish a uniform line, and unless legislation is immediately secured to curb this manner of obtaining title to city property, the city by reason of the increasing size and growth will not only be put to expensive litigation, but may eventually be compelled to condemn and pay damages for that which it originally held title to for street and highway purposes."

PITTSBURG, PA.—The abolition of street pavement guaranties is being considered by Mayor Guthrie and the principal officers of the Public Works Department. It is claimed that streets will be in better condition, if laid under rigid inspection, without a guarantee, because the contractor's maintenance agreement gives him a certain control over street repairs in the matter of openings in the five or ten years during which his guarantee runs. As

the matter now stands, a plumber or other person desiring to cut into a pavement must go to the contractor who laid it and get permission, leaving a deposit, or otherwise, to open the street. It is believed that taking the street absolutely off the contractor's hands on completion of the work will result in keeping it in better condition.

PUEBLO, COL.—The benefits of public improvements, especially paving, are shown in the rapidly increasing value of property within the paving districts of Pueblo. It is reported that this increase will more than pay the cost of the paving. It should stimulate a demand for paving among property owners in sections of the city where this improvement has not been made.

ST. PAUL, MINN.—City Engineer Rundlett has furnished to the Board of Public Works an estimate on the cost of macadamizing and curbing Marshall avenue from Grotto street to the Bridge. The nature of the improvement will vary in different sections. In sections where macadamizing only is necessary the cost will be \$1.70 a front foot. Another section where the roadway is wider will cost \$2.57. In the next section, where curbing and boulevarding will be needed as well as macadamizing, the cost will be \$3.28. In three other sections, variations in the plan of the work will make three other prices per front foot, so that in an improvement costing about \$93,000 there will be six different rates of assessment.

WAREHAM, MASS.—A proposition to widen Main street is the subject of a petition to the Commissioners of Plymouth County. The present is a favorable time for the work, as a fire has left a considerable tract on one side of the street vacant. Two plans are discussed. One is to widen the street the width of one sidewalk and the other is to construct a new 27-foot roadway, leaving a line of elms, now in the sidewalk, in the center of the street.

Sewerage and Sanitation

HOBOKEN, N. J.—That the sum of \$1,000,000 would be required for drainage was the statement of Mr. Lange at a recent meeting of the Board of Trade. It has been estimated hitherto that a pumping system could be constructed for \$250,000. Mr. Fugazzi, who has been working hard on a special committee of the Board, desired to bring the matter to a head by prosecuting the Mayor and Council for maintaining a nuisance. Finally, a motion was passed authorizing the Sewer Committee to employ an expert to recommend a suitable system.

JERSEY CITY, N. J.—A revision of an assessment for a sewer built more than eight years ago has been ordered by the Street and Water Board. The sewer was built in Manhattan avenue and cost \$83,000. The settlement was made on the basis of the city assuming \$15,000 of the cost instead of \$7,000, as originally assessed. In the meantime, the cost of this sewer has been carried by the issue of improvement certificates.

NORTH PLAINFIELD, N. J.—Negotiations are under way for the purchase of a farm in North Plainfield for the purpose of building a sewage disposal plant. At a recent meeting of the Sewage Commission the report of Geo. W. Fuller, of New York, was discussed. It is the opinion that it will be cheaper and better for the borough to erect and maintain an independent sewage disposal plant rather

than connect with the Plainfield system. Chairman W. J. Butfield and other members of the Commission are reported to be opposed to the union with Plainfield.

MILWAUKEE, WIS.—Consumptives will be barred from employment in all bakery shops in the city of Milwaukee. The Board of Health is engaged in an investigation to find out whether men with contagious diseases are employed in the making or selling of breadstuffs. Dr. Bading states that there is now no consumptive employed in any of the bakeries; several cases had been found, however, and the afflicted employees had to be dismissed.

MORRISTOWN, N. J.—The Board of Sewerage has made a report to the Board of Aldermen favoring a local disposal system, to include the construction of sedimentation tanks, contact beds, sand filters and sludge beds, the effluent from which will flow into the Whippany River. The report was read by the President of the Commission, Rear Admiral Philip H. Cooper, who stated that streams flowing through the town were daily polluted by drains, overflows and cesspools. A trunk sewer plan, connecting with a sewer at Summit, was dismissed on the ground that the arrangement could be temporary only and would cost \$714,500. The items of cost of the disposal system are given as follows: Sewering town, \$174,499; disposal works, \$99,100; automatic pumps, \$10,100; right of way and legal expenses, \$67,000; engineering superintendence, \$18,437; total, \$269,087.

RENO, NEV.—The city will endeavor to have the time for completion of new sewers extended. Mayor Wilson states that the work will cost \$300,000 and will practically bankrupt the city. At a recent conference with Governor Sparks, Mayor Wilson was told that the Governor would not sign any bill the Legislature might pass repealing last year's act forbidding Reno to dump sewage into the Truckee River.

Waterworks

BERKELEY, CAL.—At a session preceding the adjournment for the meeting of the Chamber of Commerce, the Town Trustees passed the water ordinance fixing the rate for the next fiscal year at 25 cents per 1,000 feet, or a minimum of \$1.50 a month. The water company will furnish all water for city fire purposes free of charge, and construct all hydrants desired and keep them in repair.

CAMDEN, N. J.—The daily consumption of water for the year 1906 has averaged 148 gallons per capita, according to the report of Water Chief Hollingsworth. The total consumption was 13,000,000 gallons per day, of which the portion used in manufactories, saloons and laundries is metered and amounts to 1,200,000 gallons per day. The cost of supplying meters to all consumers in the city would be \$150,000. If this should be done, the Water Chief believes the present supply would be sufficient for several years to come. However, test wells will be sunk in the meadow tract at Forest Hill Park with a view to establishing additional wells. The suggestion of some people that Delaware river water be used will not be entertained by city officials acquainted with the conditions.

GRAND RAPIDS, MICH.—Three plans for an increased water supply have been proposed in a report by Hazen and Gray. 1. The Lake Michigan plan. 2. Slow sand filtration of Grand river. 3. Mechanical or rapid sand filtration. The Lake Michigan plan contemplates going to Lake Michigan, a distance of 40 miles, establishing a pumping station on the lake, and furnishing the city with pure Lake Michigan water. This plan can be carried out at an initial cost of \$3,000,000 to \$4,000,000. The slow sand filtration plan contemplates taking water from Grand river and filtering it by the slow sand filtration process

without the use of a coagulant. This is estimated to cost \$1,500,000. The third plan contemplates taking water from Grand river, but filtering it by the mechanical or rapid sand filtration process, using a coagulant. The cost of this system would approximate \$250,000. The first plan is considered by many as prohibitive on account of its expense, while reasons of economy are urged for adoption of the third.

JACKSON, MISS.—At a special meeting the City Council has rescinded its former action and has ordered that a vote be taken, August 26, on two propositions only, either to purchase the present private water plant at \$386,000 or to renew the contract for 25 years. A somewhat conflicting proposition to issue \$250,000 paving bonds which was to have been decided on at the same time may be voted on later. At the waterworks election a majority of two-thirds is necessary in order to decide on municipal ownership.

MONTREAL, CANADA.—Owing to a break in the shaft of a 10,000 gallon Worthington pump, the city was recently short of water for two days. The pump to which the accident occurred is one of a number which raise water from a canal leading from the St. Lawrence river above the city to a reservoir 204 feet above the river, from which the water is distributed throughout the low water level. The present consumption of water is reported as 33,000,000 gallons per day for a population of 270,000. A new pump of 12,000,000 gallons capacity is being installed and is expected to be in commission in two months.

PHILADELPHIA, PA.—Chief Gillette, of the Filtration Bureau, has issued, through the Director of Public Works, a notice to West Philadelphia residents that further waste of filtered water in that section will necessitate the turning of raw water into the mains to make good the deficiency. The waste is caused largely by householders allowing taps to run all night to prevent freezing.

Street Lighting and Electric Power

BUFFALO, N. Y.—The citizens are wondering whether the Buffalo Gas Company is a humorist. The alleged finesse consists in the bid, recently opened, for supplying gas for city purposes and for the public for the next five years. Although it was known that there would not be any competing bid, it was expected that there would be some reduction in price. The old price for municipal gas was 75 cents; the new price, 74.99 cents per 1,000 cubic feet. In addition, a reduction of .01 cent will be made for each of the five years of the contract. The public, which has been paying \$1.00 net, need only pay 99.04 cents per thousand, with a further reduction of .01 cent for each succeeding year of the contract.

GALESBURG, ILL.—The City Council has adopted a resolution indorsing a legislative bill which is designed to give to cities the right to regulate the price of gas and electricity and its standard of quality, and also provide for the inspection of such gas and electricity. It was further resolved that copies of the resolutions, besides being forwarded to members of the Legislature, should be mailed to all cities of the State of over 10,000, with a request that they adopt similar resolutions.

HAMILTON, O.—A formal proposition has been received from the Union Oil Gas Company, of Marietta, to furnish a gas plant for the city under the following terms: To erect a gas plant of 250,000 cubic feet, 24-hour capacity, at their own expense, the plant to be paid for after a ten days' test, the price being \$25,000. Dr. J. F. Bickley explained to the Council that the gas was made from oil and water. The gas contains no hydrogen and little oxygen. On the basis of \$1.00 per barrel for oil it is figured

that the gas will cost 15 cents per 1,000 in the holder. The process is not at present in operation in any city.

LINCOLN, NEB.—The partial destruction of the Lincoln Gas Company's plant plunged the city into darkness. Fire Chief Clement narrowly escaped death and Captain Eddy was dangerously injured. The firemen succeeded in saving the huge gas tank. The loss is estimated at \$50,000.

NEWARK, N. J.—The independent electric-light plant in the new City Hall will be installed under the direction of J. M. Seymour, who has had charge of the heating and ventilating work. The cost of the plant is estimated at \$25,000 or \$30,000, if a storage battery is included in the plant. It is expected that the plant can be put in operation by September next. The question of building a large plant for street lighting is still undecided and is being considered in connection with reduction in rates offered by the Public Service Corporation who, in place of the present charge of \$05 for arc lights, are willing to make the rate \$85 up to September, 1908, and after that time \$70.

Fire and Police

COLORADO SPRINGS, COL.—The red light system of alarm to call all the patrolmen to Police Headquarters in an emergency, will soon be installed. Three lights will be so placed as to be visible along the principal streets. They can be lighted simultaneously by pushing a button at headquarters. The intention is to increase the number of lights in the future.

CORNING, N. Y.—The annual report of the Board of Fire Commissioners shows the total expenditures for the year were \$7,340. The item of salaries amounted to \$2,830. For new apparatus there was paid, hook and ladder, \$1,350; team, \$500; harness, \$125; equipping new bunk rooms, \$409; two fire alarm boxes, \$251; miscellaneous items, \$92. The maintenance items were: Battery supplies, \$109; line work, \$88; supplies and repairs, \$589; appropriations to volunteer companies, \$550; Firemen's Association, \$77; maintenance of team, \$314; maintenance of bunk, \$50.

HAVERHILL, MASS.—Chief Engineer Gordon, of the Fire Department, has recommended the installation of municipal telephone lines between the various engine houses. He states that he can purchase twelve instruments for \$100 and install them for another hundred. At present the city rents eight telephones.

PORTSMOUTH, VA.—In his annual report Chief Murden of the Fire Department urges the importance of precautions for safeguarding of lives in theaters, churches and lodge rooms. Rigid regulations regarding the storage of dangerous oils and explosives is also recommended. During the past year the department has responded to forty-three box alarms and twenty-seven telephonic alarms. The causes of these fires were: Defective flues and hearths, 14; spontaneous combustion, 8; chimney fires, 8; lamp explosions, 12; sparks from chimneys and stacks, 6; defective wiring, 4; trash barrels and boxes, 3; gasoline stoves, 4; false alarms, 4; country fires close to city, 7. The equipment of the department, January 1, 1907, was: One Nott engine, 1,000 gallons' capacity; one Amoskeag engine, 800 gallons; one La France engine, 700 gallons; two double tank combination wagons, one carrying 1,250 feet of cotton hose, and one carrying 1,000 feet of rubber hose; one hose cart, carrying 750 feet of rubber hose; one 55-foot aerial extension ladder truck. There are thirteen horses in use. Extra hose to the amount of 750 feet is held in reserve. The paid men in the service are: Three engineers, three assistant engineers, seven drivers, two wagonmen and one tillerman.

Government and Finance

EDEN, ME.—The annual report of the town of Eden (Bar Harbor) has been published, from which the following items of expenditures are taken: Town charges, \$17,200; maintenance, \$4,853; new alarm system, \$2,591; water for municipal purposes, \$3,775; exterminating brown tail moths, \$1,553; town roads, \$20,095; State roads, \$4,318; new sewers, \$9,000; repairs to sewers, \$1,227; sidewalks, \$5,522; sprinkling streets, \$3,010; cleaning streets, \$1,016; lighting streets \$6,500; a damage suit for injury on highway, \$1,887; interest, \$3,881; principal on notes, \$16,900; open-air concerts, \$650; garbage disposal, \$3,600. The debt is \$30,832, a decrease of \$18,105 in the year. The assessed valuation is \$6,039,205.

GRAND RAPIDS, MICH.—The Committee for a Safer City of the Grand Rapids Board of Trade has called attention to the practice of setting water bottles, boxes, etc., on outside window ledges directly over the sidewalk, where a slight touch, sudden jar or gust of wind might precipitate them to the walk below. A water bottle falling three or four stories and striking a person on the head would mean sudden death. It has been suggested that the police should be on a constant lookout for these dangers, and should see that the practice of placing such things on the ledges is discontinued, or that the boxes, bottles, etc., are securely fastened.

GARFIELD, N. J.—The Council has decided to have an ordinance drafted creating the position of Superintendent of Public Works. It was the opinion of the Councilmen that a man was needed to look after the waterworks as well as other matters. There have been complaints lately of inaccurate reading of water meters. One property owner had a bill showing a consumption of 8,000 feet of water, when his meter showed a consumption of 1,500 feet.

HAMILTON, O.—A committee of citizens appointed by Mayor Thomas to look into the question of forming a "Greater Hamilton" has reported in favor of adding territory to the city which will double the area and greatly increase the population. To the suburbs it means all the privileges enjoyed by the citizens of Hamilton, such as gas, electric light, pure water, fire and police protection, as well as a community of interests. In line with the development of the city Mayor Thomas has an idea of creating a Board of Trade by having the City Council pass an ordinance creating a board which would consist of twelve members, to serve for one, two or three years, according to appointment.

RACINE, WIS.—The Racine Civic Federation has adopted a platform, some of the terms of which are: Separation of politics from municipal affairs. Equality of taxation—the opinion being expressed that small property owners are paying more than their share of the taxes. Payment of good salaries to assessors, so that they may give their whole time to their work, and the maintenance of a permanent office for them. Requirement of an inventory of property from every factory, capitalist and business house. The purchase and ownership of waterworks. Payment by the city for intersections and one-third of the frontage in the assessment of new pavements. Four years' term for Mayor and \$3,000 salary. Competition and compensation in the awarding of franchises.

WORCESTER, MASS.—Desiring to float a temporary loan and failing to obtain it from local bankers, Mayor John T. Duggan sent City Treasurer F. W. White to Boston, where the best terms he could get for \$50,000 was 5.12½ per cent., with interest discounted. The last loan was placed at 4.81, and a loan a year ago 3.75. Mr. White learned that the city of Newport paid 6 per cent. for a temporary loan on the same day.

Refuse Collection and Disposal

JOLIET, ILL.—An art collection has been gathered at the city crematory by the men who work about the place. Etchings, photographs and even paintings have been found in the waste and saved for decorating the plant. The men are now thinking of establishing a lost-and-found bureau. Among the articles that have been called for are a silver teapot and a laundry bundle. Anything may be expected at the terminus of the garbage can route.

NEW BERNE, N. C.—The Civic Improvement Club has issued a notice to their fellow citizens requesting that each householder pick up papers and trash in front of his premises as far as the middle of the street; that all unnecessary fences be removed, and that plots in front of dwellings be ornamented with flowers or shrubs; that back yards be cleaned up.

REVERE, MASS.—The Board of Health has decided that after August 1 no more garbage shall be brought into town for the maintenance of piggeries. For years the four large establishments have been maintained by garbage contractors, who take the supply from neighboring towns and feed it to 5,000 pigs. Efforts have been made for years to get rid of the business, but without success, as the farmers, who comprise a large part of the voters of the town, have stood by the pig owners. One establishment, for the disposal of the local supply, will continue.

SAN FRANCISCO, CAL.—A San Francisco House Cleaning Day, when merchants and their employees, labor unions, teamsters, contractors and everybody who can assist, will be asked to take up shovel and broom in behalf of clean streets and sidewalks, has been proposed by the merchants and civic organizations. Assurances have been received from many contractors that the use of teams for hauling away mud and debris will be donated and several labor unions have promised to furnish men. The importance of the work is such that a Sunday in the near future has been suggested as opportune for the work.

SPOKANE, WASH.—Mayor Floyd L. Daggett has announced that he will issue a proclamation setting aside Saturday, April 6, as a special arbor and cleaning-up day, when, under the direction of the City Beautiful Committee of the 150,000 Club, 50,000 men, women and children of the population of 95,000 will join in a concerted movement to clean the city and plant trees and shrubs. All will be done by voluntary service, and mining kings, lumber barons, bankers and business and professional men and women will work shoulder to shoulder with salesmen, clerks and laborers. Mayor Daggett has been appointed chairman of the Cleaning Day Committee, which will co-operate with the City Beautiful Committee, headed by C. Herbert Moore, a local capitalist, and the 150,000 Club. Between 20,000 and 30,000 persons took part in the cleaning-up day operations March 31, 1906. Alleys were cleaned and the fronts of residences and business houses were made spic and span.

Parks and City Beauty

ATLANTIC CITY, N. J.—Plans for the development of the city are being prepared by Carrere & Hastings of New York. The board walk will be transformed into an esplanade of concrete construction, bordered by lawns and trees. The avenues of the city will be widened, a new boulevard between Pacific avenue and the beach will be laid out. New piers will be rebuilt, with the exception of one or two of the most modern, and pavilions enclosed in glass and heated in winter will be built at in-

tervals. An elaborate system of illumination, in which tall towers with thousands of globes will be a prominent feature, will be worked out, the marsh land between the city and the mainland by construction of canals, making the section an American Venice.

BOSTON, MASS.—A bill in favor of placing Boston playgrounds, during vacations as well as term time, in charge of the School Board, is being prepared by the Massachusetts Civic League. The argument is that the character of the supervision which teachers can exercise is superior to the care that can be expected from employees of other departments. Now, unsupervised playgrounds are monopolized by men and big boys. The League says: "The cost of the twenty-one playgrounds in the charge of the Park Department, together with Wood Island Park, Charlesbank and Franklin Field (which last three are also partly parks) has been \$3,315,000. The expense of maintenance is \$53,000 a year. We ought either to spend the additional amount necessary to make these playgrounds useful, or we ought to sell them and save interest, the present expense of maintenance and the loss of taxable property."

FARGO, N. D.—A few years ago the first appropriation of \$400 for parks was reluctantly made by the City Council. Since that time there has been a remarkable change in the sentiment toward appropriations for the city park. Now \$3,000 is given without protest. The surroundings of the park have, however, been unsightly, hence the public heard with pleasure that Mr. M. D. Hodgson had purchased the land adjoining and intends filling the lot, leveling it with top soil and seeding it.

PHILADELPHIA, PA.—The first actual work of construction of the Parkway between City Hall and Fairmount Park was formally begun on February 23. Director of Public Works Hathaway, in the presence of a cheering crowd, loosened the first brick with a silver pick in the chimney of a house to be demolished on North Twenty-second street. The Parkway consists of a 200-foot boulevard leading from the northwest corner of Logan Square to the Green-street entrance of Fairmount Park. The cost of the work is limited to \$2,000,000.

WASHINGTON, D. C.—More than 150 members of the Washington Playground Association, their friends and a number of guests, met at a banquet recently to discuss the achievements of the association during the past year and to advocate plans for the future. The chief purpose of the banquet, as stated by Mr. Cuno H. Rudolph, the president of the association, was to help along, as far as possible, the pending bills before Congress, one of which provides an appropriation of \$75,000 to purchase sites for playgrounds, and the other \$10,000 for the equipment of the same. President Roosevelt, who was unable to attend, sent a message in which he strongly advocated the playground movement in Washington, and his words elicited much attention. While the movement in Washington has been somewhat behind that in other cities, the vigor with which the work is being pushed indicates that it will not be long before the National Capital will be in the vanguard.

Rapid Transit

NEW YORK, N. Y.—The New York Central Railroad Company has agreed to place its tracks in Eleventh avenue in a subway, between Thirtieth and Seventy-second streets, and to abolish every grade crossing from Seventy-second street to Spuyten Duyvil. The Rapid Transit Commission has agreed to allow the company to operate six tracks throughout the whole length. South of Thirtieth street the problem will be solved, if the bill being drafted passes the Legislature, by the construction of an elevated structure between West street and the water

front, to be owned by the city and leased to all railroads that care to use it.

ROCHESTER, N. Y.—Mayor J. G. Cutler and Manager R. E. Danforth of the Rochester Railway Company formally executed an agreement by the terms of which certain concessions are made to the city. In future the company will pay half the cost of cleaning snow in all streets in which it operates. The company will also pay the whole cost of sprinkling in the car tracks. Suburban lines will exchange transfers with local lines and will make the same stops as local cars. No additional suburban lines can run cars on Main street without permission of the Aldermen. The control of trolley freight cars and the specification of times when they may run is left to the city authorities.

PHILADELPHIA, PA.—After considering the plans for improving the street railway facilities submitted by the Retail Merchants' Association and the Trades League, the directors of the Rapid Transit Company decided not to accept either plan as a whole, but to present to the stockholders a plan of their own. With few exceptions the suggestions made by the retail merchants met with their approval. The only suggestion of the Trades League which the company was willing to concede was the demand for the surrender of the Broad-street subway and the Frankford line—if the company could not finance them properly. President Parsons, in a letter to the Trades League, declared that most of the eight sections of which their address is made up are impossible of performance because they so closely affect the interests of companies which the Rapid Transit Company leases but does not wholly control. The plan which President Parsons approves is that the city assist the company in the matter of credit and receive a percentage of earnings.

PORTLAND, ORE.—The Portland Railway, Light and Power Company has announced its intention of building a terminal station modeled on the lines of the Los Angeles station. The building will cost \$1,000,000 and will be located upon the block bounded by First, Second, Pine and Ash streets.

TORONTO, CANADA.—A company of Toronto capitalists have made application to the Provincial Government for a charter to build and operate an elevated railway in the city and suburbs in the northeastern and western ends of the city. Toronto's population is so great that the surface roads are unable to meet the existing needs, let alone the future. The application for a charter was made by M. J. Adams, S. R. Wickett, J. M. Sinclair, J. H. McKnight. R. F. Segsworth is solicitor for the company.

Miscellaneous

DULUTH, MINN.—The Duluth aerial bridge, the only one in this country, has completed the first year of its existence with a record of 2,500,000 passengers transported at a cost of one-fifth of a cent each. The cost of repairs has been practically nothing, so far, and the expenses of operation have been for oil, electric current and the wages of three men who operate it. In summer from 200 to 1,000 passengers are transported at a load at intervals of five minutes. The bridge cost \$108,000.

GLENSIDE, PA.—The Glenside Improvement Association of Glenside terrace was founded two years ago for the purpose of securing better street lighting. The membership now comprises 100 residents of "newer Glenside," as that portion of Abington township is called, everyone a property owner who is interested in betterments and improvements. It is now desired to include in the organization of "old Glenside." An effort will be made to improve train facilities. Notes will be taken on the blocking of crossings, so that commuters need not watch

their train start off when they are on the other side of a freight train.

JOPLIN, MO.—Joplin has an unusual source of income—namely, a royalty from mines, which amounted in 1906 to \$1,808. The mineral lands came into the possession of the city in the course of a real estate transaction in which a cemetery tract was acquired, and a strip of nineteen and a half acres was left over. At the time of purchase there were no mines in the vicinity and the presence of the zinc and lead ore was not suspected.

KNOXVILLE, TENN.—A municipal insurance system has been proposed and will be investigated by Council. The State of Tennessee has been insuring its buildings for a number of years and is said to be making money by so doing. If the city owned only one building, the plan would not be thought of, but as its property is scattered the risk of a total loss is small. The only insurance money the city has received was for some plate glass which was shattered by an explosion.

MUNCIE, IND.—The Board of Works with representatives of the Muncie Electric Light Company is making investigations with a view to relieving blockades in alleys which are said to result from the extension of the lines of the local telephone and light companies. The company is placing an increasing proportion of its poles in alleys in response to popular and official demand that as many poles as possible be removed from the streets. The company would prefer to place poles on private property just inside the street line in downtown districts, but this is impossible, as buildings are generally built on the line. In residence districts owners, as a rule, do not wish poles put on their property.

NORFOLK, VA.—In answer to a request for suggestions that would tend to improve and beautify the city, Miss Virginia Gatewood, president of the Woman's Auxiliary of the Citizens' Commission, replied: That the work of rearranging porches now going on should be suspended until after the fair, so that the carpenters might do more important work; that care should be taken not to overload ash carts; that garbage and ashes be removed four instead of three times a week; that collectors be requested to handle cans so as not to bend them, and that covers be replaced; that a law be passed forbidding the purchase or sale of second-hand garbage cans, so that there will be no inducement to anyone to steal them.

PORT TOWNSEND, WASH.—The City Council refused to return to representatives of the Tivoli Machine Company either in whole or in part of the \$200 which the gambling machine managers paid into the city recently for a month's permit to operate the devices. Public sentiment forced the Council to revoke the action of the License Committee. The machine operators declare they will secure the refund if it costs \$500 to do so, and personal suits against Mayor Hill and individual members of the Council are promised if the city refuses to disgorge.

SOMERVILLE, N. J.—A polechopping brigade, headed by Charles Kenyon, president of the Board of Town Commissioners, has cut down a row of forty-foot telephone poles recently erected on West Main street by the New York and New Jersey Telephone Company. The Town Commissioners accuse the company of using high-handed methods in an attempt to erect a line of poles through the town. The company threatens legal redress.

WEST DERRY, N. H.—State Bacteriologist Dr. H. N. Kingsford has reported that the examination of dogs' brains sent from West Derry showed the presence of rabies. The State Board of Health advises muzzling of all dogs in the town, or at least all which could have come in contact with the diseased dogs. The order should remain in force until revoked.

LEGAL NEWS

A Summary and Notes of Recent Decisions
—Rulings of Municipal Interest

Interstate Ferries

New York Central Railroad vs. Hudson County Freeholders.—The Board of Freeholders claimed the right to limit ferry fares under an ancient act of 1797. Judge Swayze holds that the subject is one involving interstate commerce, and as such the power of the Federal Government is absolute. Neither the freeholders nor the Legislature has any rights in the premises.—Supreme Court, Trenton, N. J.

Vacation of Streets

Mitchell Motor Car Co. vs. Racine.—The Motor Car Company petitioned the Circuit Court to cause to be vacated a certain plot of ground and the streets contained therein. Judge Belden held that the court is without jurisdiction and that such action can only be taken by the Common Council. At the trial the company presented volumes of testimony to show that the streets were useless except to themselves and that the city would be benefiting itself as well as the firm by vacating the property. The court expressed the opinion that the authority delegated by the Legislature to the Common Council is exclusive and that the charter provision is superior to the general law on the subject.—Circuit Court, Racine, Wis.

Paving Assessment

Erie Railroad Company vs. Trenton.—The railroad company appealed against an assessment for permanent paving on Market street, in the vicinity of the Erie depot. The contention of the railroad was that it received no benefit from the asphalt pavement laid on Market street and that it should therefore not be compelled to pay the assessment, amounting to \$1,000, levied upon it. City Counsel Merrey claimed that the improvement benefited the property by making the approach to the station more agreeable to patrons. The court held that the railroad should pay the assessment on some of the lots, but be exempt on some others which were located on a siding.—State Supreme Court, Trenton, N. J.

Electric Meters

Westinghouse Electric and Manufacturing Co. vs. Diamond Meter Co.—The Westinghouse company, and, by agreement, the General Electric Company have been manufacturing electric meters under two patents granted to Nicola Tesla. The case against the Diamond Meter Company is the last of a number of cases in which the Tesla patents have been upheld. In this case Tesla is given full credit for his original conception.—United States Court of Appeals, Chicago, Ill.

Change of Grade

Roach vs. Borough of Washington.—The plaintiff appeared before viewers on the question of a change of grade and claimed damages but refused to say how much and failed to produce witnesses. The viewers awarded him no damages and assessed no benefits, whereupon he appealed. Held, that a motion to quash the appeal should be refused.—Common Pleas, Washington County, Pa.

Tax on Poles

Borough of Washington vs. Western Union Telegraph Company.—The right of a municipal corporation to charge a license fee as a police regulation upon poles erected in the borough of telegraph, electric light and other companies is unquestioned, but the fee charged must be reasonable and must not be collected and used for the purpose of revenue, but as a means of defraying the cost of inspection only. Where it appears that in the past the fee was collected and turned into the borough treasury and used as revenue and no inspection made by the borough, the company, in an action to collect the fee due, can set off the amount so collected and used against the present indebtedness.—Common Pleas, Washington County, Pa.

Franchises

Citizens vs. Denver Gas and Electric Co. et al.—The County Court has no jurisdiction to try cases in which validity of franchises was contested. The court held that no charter of the city or county of Denver could confer such jurisdiction.—Supreme Court, Denver, Col.

Furlough Law Sustained

Henry Carney vs. Detroit Police Department.—Carney sued to recover pay under the twenty-day furlough law, of which he had been denied the benefit. The Department was ordered to pay Carney \$26.70 for ten days' time. The payment of similar amounts to other members of the force is involved.—Supreme Court, Detroit, Mich.

Liability for Accident

Switzer vs. Harrisonburg.—The liability of a municipal corporation for the death of an employee from injuries inflicted in the performance of an ultra vires act is denied.—State Court, Harrisonburg, Va.

Paving Assessment

Chester vs. Evans.—In 1899 the city paved Edgmont avenue with brick, and Evans refused to pay his assessment on the ground that the work was repaving, the original paving being in 1870. The Delaware County Court gave a decision in favor of Evans. This was reversed by Judge Johnson. The case went to the Supreme Court and the decision, which is final, was in favor of Evans on the ground that the work was repaving.—Supreme Court, Pennsylvania.

Smoke Ordinance

Atlantic City vs. France.—City Solicitor Wootan has won his case on the validity of the smoke ordinance which came up for review in the city's case against the ice plant, which has been using soft coal. This case is said to establish a precedent in all States.—Supreme Court, Trenton, N. J.

NEWS OF THE SOCIETIES

The American Society of Civil Engineers.—At the regular semi-monthly meeting, February 20, Mr. G. W. Tillson presided. Mr. C. E. Gregory read a paper on the "Rainfall and Run Off in Storm Water Sewers." Mr. Edward Wegman read a paper on "The Design of the New Croton Dam." Certain points in the construction of the New Croton Dam were discussed by Mr.

Charles S. Gowen. Referring to the matter of a vote on the question of the advisability of appointing a committee to report on Engineering Education, the secretary announced that fifty votes were still needed to bring the number up to the constitutional requirement. Members who have not done so are requested to vote. At the meeting on March 20 a paper will be read by C. E. Grimsky, on "The Lower Colorado River and the Salton Basin." On April 3rd a paper will be read by C. C. Schneider, past-president, on "Movable Bridges."

Municipal Engineers of the City of New York.—At the recent annual meeting officers were elected as follows for 1907: President, George S. Rice; vice-presidents, Robert Ridgway and Robert R. Crowell; secretary, Clarence D. Pollock; treasurer, Arthur S. Tuttle; directors, Henry R. Asserson, Benj. S. Wever, Edward A. Byrne, Llewellyn W. Freeman, Edward H. Holden, Martin Gay, Herman K. Endemann, Wm. R. Hillyer, Edward L. Hartmann, George R. Olney, Wm. D. Lintz, Frederick C. Noble, Alberto Schreiner, Cornelius V. Powers, Daniel D. Jackson.

Arkansas Mayors' Association.—A number of mayors of the cities of Arkansas met at Little Rock, February 19, in the quarters of the Business Men's League. Mayor Hugh Martin, of Helena, was made chairman, and J. S. Hawkins, secretary of the Good Roads Association, was elected secretary. The object of the meeting was to formulate and secure desired legislation for cities of the first and second class. Among the mayors present were: Hugh Martin, Helena; P. B. Bacon, Texarkana; H. C. Pernot, Van Beuren; R. F. Ruder, Fayetteville; George R. Bedlong, Hot Springs; Henry Kuper, Fort Smith; John R. Caldwell, Pine Bluff; Warren E. Lennon, Little Rock.

Calendar of Meetings

March 12-14.

American Roadmakers' Association.—Convention, Carnegie Music Hall, Pittsburgh, Pa.

March 20.

The American Society of Civil Engineers.—Semi-monthly meeting. Paper on "The Lower Colorado River and the Salton Basin." By C. E. Grimsky. House of the Society, 220 West Fifty-seventh street, New York City.

April 18-21.

Southwestern Gas, Electric and Street Railway Association.—Annual meeting, San Antonio, Tex.—Frank C. Duffey, Secretary, Beaumont, Tex.

May 28-30.

American Society of Mechanical Engineers.—Spring meeting, Indianapolis, Ind.—Calvin W. Rice, Secretary, 12 West Twenty-first street, New York.

June 1-4.

American Anti-Tuberculosis League.—Annual convention, Atlantic City, N. J.—Dr. George Brown, Atlanta, Ga., President; Dr. Edward Guion, 1408 Atlantic avenue, Atlantic City, N. J., Vice-President.

June 12.

National Conference of Charities and Correction.—Thirty-third Conference, Minneapolis, Minn.

June 18.

International Association of Chiefs of Police.—Annual convention, Auditorium, Jamestown Exposition Grounds.—Major Richard Sylvester, President, Washington, D. C.

June 20-22.

The Playground Association of America.—First Annual meeting, Chicago, Ill.—Dr. H. S. Curtis, Secretary.

August 6-8.

American Association of Park Superintendents.—Annual convention, Toronto, Ont.—F. L. Mulford, Secretary, Harrisburg, Pa.

August 20-22.

The International Association of Municipal Electricians.—Annual convention, Foster, Secretary, Corning, N. Y. Jamestown Exposition, Norfolk, Va.—F. P. Foster, Secretary, Corning, N. Y.

REVIEW OF THE PERIODICALS

Abstracts and Synopses of the Most Important Articles Treating of Municipal Topics Which Have Appeared During the Past Month in the Leading United States Periodicals and a Few Others

Indexing Periodicals

IN The Municipal Index we endeavor to present to our readers in the most convenient form, reference to all articles appearing during the month which would be of interest to them as municipal officials or as citizens interested in municipal improvements or betterments. For this purpose we examine each month more than 250 periodicals, and index all articles in these which seem to be of any importance, excepting, of course, mere news items. For certain purposes, however, and especially for further classification, and for preserving for convenient reference indexes covering many months and years and applying to trade catalogues and other matter which we cannot cover, a card index seems to be the best system devised. The advantages of and method of preparing a card index were ably explained by Prof. H. Wade Hibbard in a lecture before the Society of Mechanical Engineers of Sibley College, and reprinted in *Technical Literature* for February. Prof. Hibbard claimed for the card index accessibility, timesaving, expansibility, order, adaptability, system, divisibility, labor-saving, simplicity, contractibility, economy of space, timeliness, possibility of rearrangement and subclassification. To a municipal official preparing such an index our monthly index should be invaluable.

The Flicker Photometer

ONE of the more recent methods of comparing sources of light, such as arc lights, gas lights, etc., is by the "flicker photometer." The contrivance is described in the *Electric Review* as follows: "The surfaces illuminated by the two sources are brought alternately into the field of vision, so that the eye sees first one and then the other. The eye is then required to judge, not between two surfaces seen simultaneously, but whether the illumination of the field of vision varies. This is determined by causing the two fields to succeed each other somewhat rapidly so as to produce an apparent flickering field. The intensities of illumination are then varied until this flicker disappears, when equality is supposed to exist." With other methods difficulty is usually experienced in comparing lights of different qualities or tints; but with the flicker photometer this difficulty largely disappears because the effects of the two lights are superposed. But other considerations and possible objections are discussed in the article. In another in the same issue a writer complains of the injurious effects of the flicker on the eyes.

The Hudson River Tunnels

OF the many tunnels being constructed at present from New York City under the East and Hudson rivers, probably those for the use of the Pennsylvania Railroad are the most difficult of construction and the most interesting.

Many popular descriptions of these, both brief and extensive, have appeared in numerous literary and technical periodicals. The *Engineering News* is now publishing in a series of articles a complete technical description of the construction of the Hudson river tunnel, written by Mr. James Forgie, Chief Assistant Engineer of the P. R. R. The first installment appeared December 13; and the second, describing the use of the shield in the various materials met with, appears in the February 28 number. To those interested in the engineering of tunnelling it is of exceeding interest; others would probably find it very difficult if not impossible reading.

Park Development

THE report of Andrew Wright Crawford, the park enthusiast of Philadelphia, to the American Civic Association, as chairman of its committee on parks and public reservations, is printed in full in the February number of *Park and Cemetery*. As in all his writings on the subject dear to him, Mr. Crawford presents an exhaustive collection of facts, takes a broad view, and gives his thought in logical order. He finds that during the last year the municipal park movement made "decided advances in six directions." Two were fundamental: First, the study of the city plan and the mutual effect of plan and parks; second, a growing appreciation of the need "of giving to American cities the power enjoyed by European municipalities of condemning property that fronts on proposed parks and parkways in order to sell it at an increased price after the improvements are consummated, and thus pay therefor." The third direction in which special progress is noted is in the planning of park systems by cities of the second and third class and by towns; the fourth, the development of the use of parks; fifth, the increased purpose to beautify waterfronts; and sixth, the greatly increased exhibition of popular interest in the beautifying of cities by any or all of these means. One significant evidence of this, to which Mr. Crawford calls attention, is "the incorporation in nearly a dozen magazines of regular departments on town and city beautification." As to the growth of the playground movement, which he discusses under the head of the development of the recreative use of parks, he says: "Nearly every city has one or more new playgrounds to report for the past year." But the most important development of all, in Mr. Crawford's opinion, has been the widespread scientific study of the city plan, and the ordering of expert reports, from individual students or from commissions.

An Artistic Elevated Road

"WITHOUT doubt the new elevated electric railway in Berlin is the most artistic and thoroughly constructed roadway of its kind," says Ernest C. Moses, in an article

on "The Elevated Railway and Civic Beauty," in the February number of *The World To-day*. As in the case of the Boston elevated, the road is partly underground and partly above, there being about five miles of elevated structure and two and a half of subway. The road was opened to passenger traffic in 1902, and the total cost of the plant approximated \$9,000,000. "The stations are generally symmetrical in appearance, resting on heavy pedestals of carved masonry, which are substantial and imposing. The elevated approaches on both sides of the stations are handsomely bracketed and guarded by elaborate hand rails. The ascending entrances are thoroughly constructed and inclosed, and the train-house is likewise inclosed, with ample provision for lighting by high windows." No two of the stations are architecturally alike. "Every angle in the supports and in the braces of the iron structure has been softened and made attractive to the eye," and every portion of the minor construction, such as side railings, posts, etc., has of course been carefully designed. The road structure is watertight, and thus there is formed in the center of the streets an arcaded promenade under the entire roadbed. Particular care was taken also to deaden noise, the rails being laid on girders of the structure without the use of sleepers, a filling of pumice-stone and cement with gravel being used to deaden the sound.

The reading of this article is liable to arouse the envy of residents of New York, Chicago, Boston and other cities. A meriting of the legend "made in Germany" would, it seems, do much, and properly so, to overcome American opposition to the elevated railway.

Municipal Housing in England

THE housing of the poor in great cities in cheap but decent lodgings, at first a matter left to private philanthropy in England as it still is with us, has of recent years been very elaborately entered upon by the cities themselves in England. There houses may be condemned as unhealthy if the streets are too narrow, or the buildings overcrowded or too close together, and county councils may purchase such property without making extra payment for the high rental value resulting from overcrowding and without allowance for the compulsoriness of the sale. The argument is that the ownership of such premises implies a disregard for human life and decency that makes the landlord undeserving of consideration. Mrs. Cranston, writing in *The Craftsman* for February, gives concisely a general view of what the municipal housing operations in England have been. There are four types of such dwellings: The blocks, which are four or five stories high; the tenements, which are two or three stories, each attached house with a separate entrance and provision for four to six families; cottage flats, two stories, with fewer families; and cottages, usually built in the suburbs with small garden plots. Even in the case of the blocks, in which rooms rent at fifty to seventy-five cents a week, a certain parklike appearance has been obtained by the laying of good walks and pavements, the setting out of trees, and the planting of flowers. In the

other properties this æsthetic quality is much further developed. An idea of the extent of the municipal building operations is given by the statement that "the London County Council has undertaken thirty-four housing enterprises, twelve of them alone comprising 350 acres, the houses costing seventeen million dollars, and accommodating 70,522 persons." In Liverpool more than eight thousand houses have been destroyed and rebuilt by the city.

Graft in England

RETURNING to a theme on which he wrote in the January *Scribner*, Frederic C. Howe substantiates and amplifies in the *American Magazine* for February, the charge of which he hinted in the earlier article. This is that graft in American politics is but a kindergarten affair compared to the corruption in the English parliament. And because only parliament can grant franchises, and because it fixes the terms of purchase of a public utility when a municipality is the buyer, parliamentary conditions concern the cities and towns with painful nearness however excellent their own officials may be. Mr. Howe says, comparing America and Great Britain, "We are rebellious. She is self-righteous. With her corruption is fixed and established. With us it is changing. We shift our crooks from time to time. Her crooks are there for life. And the cost of this class control is evidenced by the appalling poverty of the people." The figures that he gives are staggering. Railroads, for instance, have paid as high as \$70,000 per mile to get their bills through parliament. "It cost the rate payers of London \$750,000 to defeat" one pernicious bill. "The little town of Barnsley spent \$75,000 on a single bill. In six years' time the London County Council spent \$570,000 in promoting bills or protecting itself before parliament." But the worst example is offered by the effort of the borough of St. Marylebone to purchase a private electric lighting plant. The borough offered \$3,000,000; the company asked \$4,000,000; and the referees—to whom, in accordance to law, the matter was left for "compromise"—put the value at \$6,250,000, and added \$2,000,000 for a new generating station and \$500,000 for their decision! His explanation is as follows: The governing class in Great Britain enjoys a sanctity of which we have no conception. A caste like that of India runs through the structure of society. Above are the landed gentry; below are forty millions of workers. The gentry own all the land—less than 8,000 of them alone own one-half of it. They also own the railways, the mines, the shipping, the franchise corporations. They employ the lawyers. They control the church and the press, and through these agencies make public opinion. Out of the aristocracy come the officers of the army and navy. The church and the civil service are recruited from its ranks. Such a class is almost as immune from criticism as is the czar or the kaiser. There can be no disclosures. Thus is England complaisant. Thus are we told that she is the country of all others upon which we should mold our conduct. "God forbid," he exclaims.

THE MUNICIPAL INDEX

In Which Are Listed and Classified by Subjects All Articles Treating of Municipal Topics Which Have Appeared During the Past Month in the Periodicals Listed Below

- Acetylene Journal, Chicago.
 Ainsley's Magazine, New York.
 American Academy of Political and Social Science, Annals, Philadelphia.
 American Architect, New York.
 American Banker, New York.
 American Gas Light Journal, New York.
 American Homes and Gardens, New York.
 American Institute of Architects, Bulletin, New York.
 American Institute of Electrical Engineers, New York.
 American Magazine, New York.
 American Society of Civil Engineers, Proceedings, New York.
 Appleton's Magazine, New York.
 Architects' and Builders' Journal, Baltimore.
 Architects' and Builders' Magazine, New York.
 Architectural Record, New York.
 Architectural Review, Boston.
 Arena, Trenton.
 Associated Engineering Societies, Journal, Boston.
 Atlantic Monthly, Boston.
 Brick, Chicago.
 Broadway Magazine, New York.
 Canadian Municipal Journal, Montreal.
 Cement, New York.
 Cement Age, New York.
 Century, New York.
 Charities, New York.
 Clay Record, Chicago.
 Clay Worker, Indianapolis.
 Construction News, New York.
 Consular-Reports, Washington.
 Contract Journal, London.
 Cosmopolitan, New York.
 Country Life in America, New York.
 Craftsman, New York.
 Department of Labor, Bulletin, Washington.
 Eclectic Magazine, New York.
 Electrical Railway Review, Chicago.
 Electrical Review, New York.
 Electrical World, New York.
 Engineer, Chicago.
 Engineer, London.
 Engineering-Contracting, New York.
 Engineering and Mining Journal, New York.
 Engineering Magazine, New York.
 Engineering News, New York.
 Engineering Record, New York.
 Engineering Review, New York.
 Engineering Soc'y of West Penn., Pittsburg.
 Engineering World, Chicago.
 Engineers' Club, Proceedings, Philadelphia.
 Everybody's Magazine, New York.
 Far Eastern Review, Manila.
 Financier, New York.
 Fire and Water, New York.
 Fireman's Herald, New York.
 Forum, New York.
 Franklin Institute Journal, Philadelphia.
 Gardening, Chicago.
 Gesundheits Ingenieur, Munich.
 Good Roads, New York.
 Harper's Monthly, New York.
 Harper's Weekly, New York.
 House and Garden, Philadelphia.
 House Beautiful, Chicago.
 Illuminating Engineer, New York.
 Independent, New York.
 Indian and Eastern Engineer, Calcutta.
 Insurance Engineering, New York.
 Iron Age, New York.
 Lippincott's, Philadelphia.
 Literary Digest, New York.
 Local Government Journal, London.
 McClure's Magazine, New York.
 Manufacturers' Record, Baltimore.
 Metropolitan Magazine, New York.
 Municipal Engineering, Indianapolis.
 Municipal Journal and Engineer, New York.
 Municipal Journal, London.
 Municipal World, St. Thomas, Ont.
 Munsey's Magazine, New York.
 Moody's Magazine, New York.
 New England Magazine, Boston.
 New England Water Works Ass'n Journal, Boston.
 North American Review, New York.
 Outlook, New York.
 Pacific Monthly, Portland, Ore.
 Pacific Municipalities, Santa Clara, Cal.
 Park and Cemetery, Chicago.
 Pearson's Magazine, New York.
 Popular Science Monthly, New York.
 Power, New York.
 Preventive Medicine Journal, London.
 Progressive Age, New York.
 Public Health, London.
 Public Service, Chicago.
 Putnam's Magazine, New York.
 Review of Reviews, New York.
 Revista Municipal, Havana.
 Rock Products, Louisville.
 Sanitary Institute Journal, London.
 Saturday Evening Post, Philadelphia.
 Scientific American, New York.
 Scribner's Magazine, New York.
 Street Railway Journal, New York.
 Suburban Life, Boston.
 Success, New York.
 Sunset, San Francisco.
 Surveyor, London.
 Technique Sanitaire, Paris.
 Times Magazine, New York.
 Tradesman, Chattanooga.
 Travel Magazine, New York.
 Van Norden's Magazine, New York.
 Village, Hyde Park, Mass.
 Water, London.
 Water and Gas Review, New York.
 World To-day, Chicago.
 Western Municipal News, Winnipeg.
 World's Work, New York.

ROADS AND PAVEMENTS

Paving.—Granite-Top Macadam Paving in Oak Park, Ill. Abstract of paper before Illinois Society of Engineers and Surveyors by R. A. Carpenter. $\frac{1}{2}$ p. Engineering News, February 14. Engineering Record, February 16.

Macadam of Mixed Rocks. Value of mixing shown by experiments of U. S. Office of Public Roads. 1 p. Engineering Record, February 23.

Brick-Paved Country Roads About Cleveland. Illustrated. $1\frac{1}{2}$ pp. Clay Worker, January.

Improvement of Public Highways. Two papers before Nat'l Brick Mfrs. Assn., by E. L. Powers and H. S. Grimes. $1\frac{3}{4}$ pp. Clay Worker, February.

Street Paving for Baltimore. Report and recommendations of City Engineer Fendall. 2 pp. Engineering World, February 1.

Street Construction in California. Discussion by delegates of League of California Municipalities. 25 pp. Pacific Municipalities, January.

Patented Paving Material. Court decision as to right of municipalities to buy them. 1-3 p. Good Roads Magazine, February.

Tarring Roads.—Specifications suggested by an English engineer. $\frac{3}{4}$ p.

Municipal Journal and Engineer, February 6.

Road Tarring Contest. Rules under which such a contest is to be conducted in England. $\frac{3}{4}$ p. Municipal Journal and Engineer, February 13.

Tar Spreading Machines. Competition arranged for in England. Rules of the competition. Abstract from Contract Journal. $\frac{1}{2}$ p. Engineering News, February 7. Municipal Journal and Engineer, February 13.

Dust Prevention on Roads.—Result of experiments on London-Portsmouth road with Akonia, Calcium Chloride, Tar and Westrumite. $\frac{3}{4}$ p. The Surveyor, February 15.

Oiling an Unpaved Street. Experience at Helena, Ark. Paper before Am. Soc. of Municipal Improvements. Francis H. Wright. 1 p. Good Roads Magazine, February.

Dustless Roads Committee. Report of the first meeting of the English National Committee. $\frac{1}{2}$ p. Contract Journal, February 20.

Plants.—Asphalt Mixing Plants. Description of those at Cincinnati and Pittsburg. Abstract of paper before Indiana Engineering Society by Chas. Brossmann, Jr. Illustrated. $1\frac{1}{4}$ pp. Engineering Record, February 9.

Brick Plant of the Barber Asphalt Paving Co. Description of mechanical equipment. Illustrated. 6 pp. Brick, February.

How Paving Brick Should be Burned. Some Evidence of. Paper before Nat'l Brick Mfrs. Ass'n., by Ross C. Purdy. With discussion. 3 pp. Clay Worker, February.

Track Construction and Asphalt Paving in Kansas City.—Notes concerning. Illustrated. $1\frac{1}{2}$ pp. Street Railway Journal, February 2.

Paving Between Street Railway Tracks and Rails, to remove the objections to T rails. Paper before Indiana Engineering Society. Illustrated. B. J. T. Jeup. $2\frac{1}{4}$ pp. Street Railway Journal, February 9.

Automobiles Destroying Roads.—Abstracts of papers before Institute of Civil Engineers, with plans suggested to prevent evil effects. 1-2 p. Engineering News, February 21.

Cement Sidewalk Specifications.—Those reported by committee of Nat'l Ass'n of Cement Users. 2 pp. Cement Age, February.

Nat'l Paving Brick Manufacturers' Association.—Statement of its aims. $\frac{3}{4}$ p. Municipal Journal and Engineer, February 6.

SEWERAGE AND SANITATION

Sanitary Systems for Gary, Ind.—Brief description of plans for water and sewerage at this Steel Company's city. Extract from address before Illinois Society of Engineers and Surveyors, by John W. Alvord. 1 p. Engineering World, February 8.

Reinforced Concrete Sewer. Illustrated description, giving dimensions, concrete proportions, etc. 1¼ pp. Engineering World, February 22.

Concrete Pipe. Methods and cost of moulding by the C. & I. W. R. R. Extract from paper before Western Society of Engineers, by O. P. Chamberlain. Illustrated. 1¼ pp. Engineering-Contracting, February 13.

Storm Sewage. Amounts resulting from heavy rains. Geo. B. Latham. 3 pp. Journal Royal Inst. Pub. Health, February.

Sewage Pumping Plant at Salem, Mass.—Pumps of a capacity of 19,000,000 gals. per 24 hrs. in four units, electrically driven. Illustrated. 1¼ pp. Engineering Record, February 23.

Sewage Disposal.—English, German and American practice and tendencies. A general review. Extract from Water Supply and Irrigation Paper No. 185, by C. E. A. Winslow and E. B. Phelps. 3 pp. Engineering World, February 8.

Maintenance of Sewage Filters in Winter. Experience and practice at Brocton, Mass. Paper before Boston Society of Civil Engineers. George E. Bolling. With discussion. 18½ pp. Journal Association of Engineering Societies, January.

Septic Tank, Contact Bed and Filters proposed for Bloomington, Ind. Illustrated description. 2 pp. Engineering World, January 25.

Septic Tanks of Reinforced Concrete at Malvern, England. Illustrated description. 5 pp. The Surveyor, January 25.

Septic Tanks and Contact Filters at Hamilton, England. Illustrated description of recently completed works. 2 pp. The Surveyor, February 1. 1 p. Municipal Journal, January 25.

Residential Septic Tanks. History and description of a design by the author. Burton J. Ashley. 1 p. Engineering News, January 31. With discussion, 3½ pp. Engineering Review, February.

Treating Chicago's Sewage.—Report on such a proposition by Rudolph Hering and Geo. W. Fuller, abstracted, 1½ pp. Engineering News, January 31. 4¼ pp. Engineering Record, February 2. Municipal Journal and Engineer, February 20.

Chemical Disposal Plant at Chiswick, England.—Description of enlargement of the plant and addition thereto of Refuse Disposal plant. Illustrated. 2 pp. The Surveyor, January 25.

Sterilizing Sewage Effluents.—Abstract of paper before Society of Engineers (England) by W. Pollard Digby and H. C. H. Shenton. Considers necessity for and methods of sterilizing. 1 p. Municipal Journal and Engineer, February 20.

Suspended Matter; Its Relation to Sewage Disposal.—Summary of paper by Eddy and Fales before Boston Society of Civil Engineers. ¾ pp. Engineering World, February 1.

Sewage Sludge.—Its nature and methods of disposing of it. John P. Lord. 4 pp. Journal Royal Inst. Pub. Health, February. Municipal Journal and Engineer, February 27.

Royal Commission and Sewage Disposal.—Failure of the English Commission to advise any particular method explained. Chapt. XVIII of "The Sewage Problem." R. Aglio Dibdin. ¾ p. Local Government Journal, January 19.

Sewage Ventilation and Sludge Disposal.—Description of work along these lines at Willesden, England. ¾ p. Municipal Journal and Engineer, February 27.

Bacterial Contamination of Streams and Oyster Beds.—Practice and cost of applying hypochlorite solutions to effluents. W. Pollard Digby and H. C. H. Shenton. 1 p. Contract Journal, January 30.

Typhoid Fever.—Responsibility of Waterworks' engineer for epidemics. Letter from a correspondent. ¾ p. Engineering News, January 31.

Dairy Wells Containing Bacteria.—Description of investigation of the dairies supplying Washington, D. C. Paper before Society of American Bacteriologists. Karl F. Kellerman and T. D. Beckwith. ½ p. Engineering News, February 7.

Sanitary Plumbing and Plumbing Laws.—Extracts from lecture by J. Pickering Putnam. 4 pp. Building Management, February.

Main Trap. "Compulsory Use of the Intercepting Trap" urged for all buildings. Paper before Am. Soc. of Insp. of Plumbing and San. Eng. ½ p. Engineering Review, February.

Main Traps on House Plumbing. Paper arguing against their use. Read before Am. Soc. of Sanitary Engineers by Charles B. Ball. 2½ pp. Engineering World, February 15.

Sanitation of Air.—Discussion of Konrad Meier in Popular Science Monthly, abstracted. 2 pp. Engineering Record, February 9.

Town Ventilation.—Editorial discussing paper entitled "The Ventilation of London," advocacy of enforcement of wide streets and deep lots. 1 p. The Surveyor, February 15.

Health of Communities.—Measures necessary for maintaining fit. Safety against pathogenic germs. (Concluded.) Drs. E. Mace and Ed. Imbleux. 5½ pp. La Technique Sanitaire, February.

WATERWORKS

Description of System.—Los Angeles 226-mile conduit. Report on the proposed project by Freeman, Stearns and Schuyler. Illustrated. 4½ pp. Engineering News, January 24. 3 pp. Engineering Record, January 26.

The Los Angeles Project. "A City's Water." By Heatherwick Kirk. ½ p. Sunset Magazine, February.

Muscataine, Ia., Water Works System. History and brief description. Illustrated. 1 p. Fire and Water, January 26.

Water Supplies of Marshfield and Waupaca, Wis. Abstract of descriptive paper before Illinois Society of Engineers and Surveyors. W. G. Kirchoffer. 2-3 p. Engineering News, January 31.

Catskill Aqueduct, New York Water Supply. Illustrated description of the project. 1½ pp. Engineering World, February 1.

Pumping Station, The Growth of the.—Review of progress since 1878. Condensed from paper read before Am. Water Works Ass'n, by Chas. A. Hague. 4¾ pp. Municipal Journal and Engineer, February 6.

Progress in Pumps. Historical address of Pres. Dabney H. Maury before Illinois Society of Engineers and Surveyors. 1¼ pp. Engineering Record, February 9.

Centrifugal Pumps. Theory, design and efficiency. Illustrated. Richard C. Williams. 3 pp. Engineering and Mining Journal, February 16.

Water Works and Electric Light Plant at Marietta, Ga. An electrically-driven, four-stage centrifugal pump supplied by current from an electric-light plant. Also filters. Illustrated. 12-3 pp. Engineering Record, February 23.

Improving Water Supplies of Marshfield and Waupaca, Wis. Wells and electrically-driven centrifugal pumps used. Abstract of paper read before Illinois Society of Engineers and Surveyors. 1½ pp. Engineering World, February 8. Engineering Record, February 16.

Water Towers at Moscow.—Illustrated description of ornate twin towers of 500,000 gals. capacity each. 1 p. Engineering Record, February 2.

Reinforced Concrete Standpipe at Attleboro. Abstract of paper before N. E. Water Works Ass'n. Illustrated. 2 pp. Engineering News, February 21.

Reservoir Embankments.—Theoretical paper before Ass'n of Yorkshire Students, Inst. of Civil Engineers. Illustrated. Wm. Watts. 2½ pp. Contract Journal, January 23. The Surveyor, January 18.

Leaking Reservoir. One over a coal mine repaired with clay puddle (concluded). Illustrated. F. Turner. 3 pp. Water, February 15.

Storage Reservoirs. Capacity, method of construction, etc., of small reservoirs. Installment of paper on "Small Water Supplies" before Association of Engineers-in-Charge. H. C. M. Shenton. 2-3 p. Local Government Journal, January 19, et seq. Abstract of entire paper. 1 p. Local Government Officer, January 19. Installment, 2½ pp. Water, February 15.

Waterproofing Concrete. Use of asphalt mastic recommended. Paper before Nat'l Ass'n of Cement Users. 2 pp. The Contractor, February 15.

High Dams.—Discussion of relative advantages of masonry and earth for these. ½ p. Engineering Record, February 2.

New Croton Dam. Theoretical exposition of the method of designing. Illustrated. Edward Wegmann. 38 pp. Proceedings Am. Soc. Civil Engineers, January.

Wooden Stave Pipe.—Discussion on durability, by four members of the society. 13 pp. Proceedings Am. Soc. Civil Engineers, January.

Purifying Water.—Paper discussing different methods and describing the author's double filtration plants. Illustrated. With considerable discussion. 69 pp. P. A. Maignen. Proceedings, Engineers' Club of Philadelphia, January.

Biology of Potable Waters. Abstract from "Annales de la Societe Zoologique et Malacologique de Belgique" (continued). Ad. Kemna. 4¼ pp. La Technique Sanitaire, February.

Double Filtration of Water. Condensed from papers read before Am. Ass'n for Advancement of Science and Philadelphia Engineers' Club, describing plants at South Bethlehem, Lancaster and Kittanning, Pa., by P. A. Maignen. Illustrated. 3 pp. Municipal Journal and Engineer, February 16.

Water Filters at Alexandria, Egypt. Description of rapid filters for about 10,000,000 gallons a day. Abstract from paper before Institution of Civil Engineers, by H. R. C. Blagden. Illustrated. 2½ pp. Engineering Record, February 23.

Copper Sulphate Treatment of Reservoirs. Description of operations at Newport, England. 1p. Water, January 15.

Mechanical Filtration Plant at Wilmington, N. C. Description of this plant, quite complete, with results of tests. Illustrated. A. O. True. 1-2-3 pp. Engineering Record, February 9.

Boiled Water, Evils of. Translation from "Cosmos." Claims such water is injurious. ½ p. Literary Digest, March 2.

Water Softening.—Theory of reactions, examination of water, etc. Paper before Indiana Engineering Society, by W. D. Collins. 1 p. Engineering Record, February 16.

Water Softening Apparatus. Description of largest in the world, for boiler purposes. Illustrated. 2¼ pp. Iron Age, February 14.

Water Rates in England.—Gives provisions of a bill about to be submitted providing for uniformity of rates throughout metropolitan area. 1 p. Municipal Journal, February 8.

Fire Hydrant Rates in California. Reports from 30 cities to League of California Municipalities. 2 pp. Pacific Municipalities, January.

Meters, Notes Concerning, in eleven cities.—2/3 p. Fire and Water, February 2.

Cast Iron Pipe Foundry.—Description of the Birmingham plant of the American C. I. Pipe Co.'s Foundry. Illustrated. 3 pp. Iron Age, February 7.

Interruption of Supply, Danger of.—This and danger of pollution at Buffalo and Washington, with consequent fire risk, discussed. 2/3 p. Engineering News, February 7.

New Jersey Water Supplies.—Report of the Potable Water Commission. 1½ pp. Municipal Journal and Engineering, February.

Siphons.—Data concerning the amount of air liberated in these from contained water. Chas. Anthony, Jr. 2 pp. Proceedings Am. Soc. Civil Engineers, January.

High Service Systems, Constructing New York's.—Description of methods of laying and testing mains, etc. Illustrated. F. E. Puffer. 2¾ pp. Municipal Journal and Engineer, February 27.

Well.—Sinking a 12-inch well. Description in detail of this work at Salem, Va., for a city water supply. Illustrated. J. N. Ambler. 1¼ pp. Engineering News, February 7.

STREET LIGHTING AND ELECTRIC POWER

Electric Light Plant at Tampa, Fla.—Description of this hydro-electric plant. Illustrated. ¾ p. Electrical Review, February 9.

Municipal Electric Works at South Norwalk. Description of plant, history of enterprise and financial statement. Illustrated. 3¼ pp. Municipal Journal and Engineer, February 6.

Municipal Lighting in Cleveland. General description. ¾ p. Municipal Journal and Engineer, February 6.

Electric Lighting in California. Discussion by delegates of League of California Municipalities. 8 pp. Pacific Municipalities, January.

Hydro-Electric Plant of Utica Gas and

Electric Co.—Illustrated description. 3 pp. Electrical Review, February 23.

Municipal Hydro-Electric Plant. Description of Parry Sound's new plant. Illustrated. 1¾ pp. Municipal World, February.

Incandescent Lamps.—Discussion of paper on new types of these before the Am. Inst. of Electrical Engineers. 10 pp. Proceedings Am. Inst. of Electrical Engineers, January.

Illuminating Gas.—Cost of manufacturing. Abstracted from testimony of Wm. D. Marks in case of New York Consolidated Gas Company vs. the Attorney General. 4 pp. Municipal Engineering, February.

Municipal Gas Plant; Personal Experiences with the plant at Santa Clara, the only municipal plant on the Pacific coast. C. E. Moore. 1 p. Water and Gas Review, February.

Electrolysis of Gas Mains.—Report of committee of American Gas Light Ass'n. 5½ pp. Am. Gas Light Journal, January 28, 7½ pp.; February 4, 7 pp.; February 11, 5½ pp.; February 18, 8 pp.; February 25, 8 pp.

Duluth's Gas and Water Report.—The year 1906 of these municipal plants. ¾ p. Municipal Journal and Engineer, February 27.

Light Standards, Results of Investigations on.—Comparisons of Carcel, Hefner and Harcourt pentane lamps. Condensed from paper before Inst. of Electrical Engineers of Great Britain. 1¾ pp. Electrical Review, February 23.

Flicker Photometer. Description of a method of comparing intensities of lights; especially valuable for comparing lights of different kinds and colors. Editorial, 1¼ pp. Abstract from Electrician, ½p. Electrical Review, February 23.

Photometry of Incandescent Gas Lamps. Paper before Illuminating Engineering Society, by Thos. J. Little, Jr. 2¾ pp. Light, February.

Street Light Photometry. Consideration of difficulties. J. S. Dow. ¾ p. Am. Gas Light Journal, January 28.

Gas Works Statistics for 1905. Extracts from U. S. Geological Survey report. Edward W. Parker. 1¾ pp. Progressive Age, March 1.

FIRE AND POLICE

Two Platoon System for Firemen.—Letter favoring, by F. H. Cowles. ¾ p. Fireman's Herald, February 9.

Two Platoon System for Firemen. Agitation for in Omaha and Camden. ½p. Fireman's Herald, February 2.

Fire Protection Engineering.—Paper before Cleveland Civil Engineers' Club. George Velten Steeb. With discussion. 12 pp. Journal Association of Engineering Societies, January.

Functions of the Police.—Abstract of address before Boston Patrolmen by President Eliot of Harvard. ½ p. Municipal Journal and Engineer, February 27.

GOVERNMENT AND FINANCE

Municipal Bonds.—Discussion of the status of those of Canadian cities. W. H. Lyon. 1¼ pp. Municipal World, February.

Depreciation.—Some Fundamental Considerations concerning the propriety and methods of allowing for this in all utilities. 1½ pp. Electric Railway Review, February 2.

Depreciation of Public Utilities. Necessity for and methods of allowing for this. ½ p. Municipal Journal and Engineer, February 13.

Municipal Ownership.—Opposing views on. Synopsis of a symposium in Moody's Magazine, October and November, 1906. 10 pp. The Arena, February.

Municipal Ownership. Discussed by an opponent, showing misleading features of many municipal reports. 1½pp. Progressive Age, February 15.

Direct Legislation Defined.—Definitions of Initiative, Referendum and Recall, by D. F. Wilcox. ½ p. Municipal Journal and Engineer, February 27.

"The Initiative and Referendum." News items and record of progress, with special notes on development in Nebraska cities and in Grand Rapids. By Ralph Albertson, Secretary Massachusetts Referendum League. 4 pp. The Arena, February.

London County Council.—Its functions ably described. Milo R. Maltbie. 8 pp. The Chautauquan, February.

Municipal Law.—Exposicion de Motivos de la Ley Municipal. Advance publication of report by a Cuban commission on this subject. 6 pp. Revista Municipal, February 10.

REFUSE COLLECTION AND DISPOSAL

Refuse Disposal Plant at Chiswick, England.—Description of this combined with Sewage Disposal plant. Illustrated. 2 pp. The Surveyor, January 25. Municipal Journal and Engineer, February 13.

Refuse Destructor and Lighting Plant. Report on proposition for East Orange. 1 p. Engineering News, January 24.

Refuse Destructor at Dunoon, England. Description of a Horsfall plant. Illustrated. 1¼ pp. Indian and Eastern Engineer, January.

Garbage Reduction Plant at Cleveland, O. Description of plant and finances of operation. Illustrated. 2¾ pp. Municipal Journal and Engineer, February 13.

Crematory at Fort Dupont, Del. Longitudinal and cross sections, with brief description. 1 p. Engineering World, February 22.

Disposal of Municipal Waste.—Tables of garbage furnaces installed in the U. S. since 1885, with descriptions W. F. Morse. 4¼ pp. Municipal Journal and Engineer, February 6.

Garbage Problem at Reading, Pa.—History of efforts to solve it. ¾ p. Municipal Journal and Engineer, February 27.

Ash-Handling Business of the Brooklyn Rapid Transit Co.—Statement of work done. Illustrated. 1¼ pp. Electric Railway Review, February 23.

PARKS AND CITY BEAUTY

"Parks, American and European."—Reprint of an interview with Samuel Parsons, from the New York Herald. 1-3 pp. House and Garden, February.

"A Review of Recent Park Development in American Cities." Report to the American Civic Association by Andrew Wright Crawford. 4 pp. Park and Cemetery, February.

"Rehabilitating and Improving the Parks of San Francisco." 1 p. Park and Cemetery, February.

Parisian Comment on Parks of American Cities. Translation of article from Revue Horticole. 2 pp. Park and Cemetery, February.

News Notes on Park Development. 1 p. Park and Cemetery, February.

Street Railway Parks. Description of those at Baltimore, Joliet, Ill., Minne-

apolis, St. Paul and other cities. Also "Laying Out an Ideal Inland Amusement Resort," by Edward P. Hulse; and "Equipment of Pleasure Resorts." Profusely illustrated. 24 pp. Street Railway Journal, February 23.

"Playground Meeting to be Held in Chicago."—Program for the national convention in June. 3/4 p. Charities and the Commons, February 2.

Municipal Art.—"Detroit's Improvement." Board of Commerce plan for extending Washington boulevard. 1/2 p. Notes and comments department, Architectural Record, February.

"A Springfield Report." Story of the river front plan. 3/4 p. Notes and Comments department, Architectural Record, February.

"The Mural Painter and His Public." By Will H. Low. 4 pp. Scribner's Magazine, February.

Public Buildings.—Suggestion of Statutory Regulation in the Procurement of Designs. Editorials. 2 pp. The American Architect, February 2, 9.

Employment of Official Architects. Editorial. 1 p. The American Architect, February 9.

Public Construction.—"What New York Owes to Tweed." By Walter L. Hawley. 5 pp. Munsey's, February.

"Beautifying Rock Creek Bridge" (Washington). An ornamental light. 1/4 p. Illustrated. Park and Cemetery, February.

Viaduct Design. First Prize design for Grand Avenue Viaduct, Milwaukee, illustrated and described. 11-13 pp. Engineering Record, February 9. 3 1/2 pp. Engineering News, February 14.

Shade Trees.—Court Decisions on the Ownership of. Report to Iowa Park and Forestry Association. By J. C. Monnett. 2 pp. Illustrated. Park and Cemetery, February.

The Elevated Railway and Civic Beauty.—By Ernest C. Moses. 10 pp. Illustrated. The World To-day, February.

TRAFFIC AND TRANSPORTATION

Street Railways.—"The Suburban Electric Railroad." Synopsis of an article by Dr. E. L. Bogart in the Journal of Political Economy for December. 1 3/4 pp. Review of Reviews, February.

Public Rights in Street Railways. Discussion, taking Cleveland's struggle as a text. H. A. Garfield. 3 pp. Editorial on same. 1 3/4 pp. The Outlook, February 2.

Chicago Street Railways; Report of Local Transportation Committee, with recommendations as to agreement between city and companies. 1 p. Engineering World, February 1.

Perils of Street Railways. Enormous number of killed discussed. John P. Fox. Everybody's Magazine, March. Abstract, 1/2 p. Manufacturers' Record, February 28.

Subways.—"The \$200,000,000 Tunnels of New York City." Synopsis of an article by C. H. Cochrane in Moody's Magazine for December. 2 1/2 pp. Illustrated. Review of Reviews, February.

Ventilation of Boston Subway. Abstract of paper describing system, before Am. Soc. Mechanical Engineers, by Howard A. Carson. 1 p. Engineering News, February 14.

Hudson River Tunnels.—Brief, popular, illustrated description of tunnels between New York and Jersey City. 1 p. Fire and Water, February 2.

Hudson River Tunnels. Description

of their construction by the Pennsylvania Railroad. Part II. Driving the Tunnels. Full technical description. Illustrated. James Forgie. 11 1/2 pp. Engineering News, February 28.

Brooklyn Bridge Terminal. Discussion of the problem and proposed solutions. 1 1/4 pp. Engineering News, January 31.

Rail Sections for Paved Streets. Advocating use of T rails. Paper before New York Street Railway Association. C. Gordon Reel. 1 1/2 pp. Electric Railway Review, January 26. 7 pp. Street Railway Journal, January 26. 1 1/2 pp. Engineering Record, February 16.

Rail Sections and Paving of Tracks. Abstract of paper before Indiana Engineering Society. B. J. T. Jeup. 1/2 p. Engineering News, January 31.

Glasgow's Rapid Transit. Description from reports by James Dalrymple, General Manager. Illustrated. 1 1/4 pp. Merchants' Guide, February 23.

MISCELLANEOUS

Civic Improvement.—Various brief articles on. The Village, February. Notes on. 2 pp. Illustrated. Park and Cemetery, February.

American Civic Association. 1/2 p. Notes and Comments department, Architectural Record, February.

The Civic Federation. Statement of its aims and results obtained. John H. McLean. 6 pp. Smith's Magazine, April. Activities in this direction of the American Scenic and Historic Preservation Society. 3/4 p. Notes and Comments department, Architectural Record, February.

"What an Enterprising Improvement Society Can Do When It Tries." Results in Framingham, Mass. By Frederic A. Whiting. 1 p. Illustrated. Suburban Life, February.

"Civic Religion." A Minister's work for his community. By Rev. Adolos Allen. 1 p. Illustrated. Suburban Life, February.

"The Story of Framingham." By Frederic A. Whiting. Illustrated. 1/2 p. Park and Cemetery, February.

Public Works at Willesden, England. Engineer's report on highways, sewers, street lighting, etc. 2 3/4 pp. The Surveyor, February 8.

Year's Work in New York City. Review by Geo. W. Tillson in President's address before Municipal Engineers of New York. 3/4 p. Municipal Journal and Engineer, February 6.

Descriptions of Cities.—"Manhattan Lights": New York at Night. By Edward S. Martin. 9 pp. Illustrated. Harper's Magazine, February.

"Seeing Philadelphia." By George Fitch. 1 p. Illustrated. Ladies' Home Journal, February.

"Cleveland—A City With Ideals." By Frederic C. Howe. 8 pp. Illustrated. The Times Magazine, February.

Birmingham, Ala. Illustrated description, largely confined to structures. 3 pp. Building Management, February.

Buenos Aires: "The South American Situation, V." By Albert Hale. 16 pp. Illustrated. The Reader Magazine, February.

Philadelphia. Historical sketch; past, present and future. Illustrated. Edwin Slocum. 9 pp. Merchants' Guide, February 23.

Housing.—"Homeless England." The municipal provision of family dwellings. By Mary R. Cranston. 9 pp. Illustrated. The Craftsman, February.

Fountains.—Public Drinking. 1 p. Il-

lustrated. Park and Cemetery, February.

Public Baths at Handsworth, England.—Brief description. Illustrated. 1 1/4 pp. Municipal Journal, February 8.

Building Regulations, London. History and discussion (continued). Paper before Institute of Sanitary Engineers, by Horace Cubitt. 1 3/4 pp. Contract Journal, February 20.

Markets and Abattoirs, Sanitary Features of. Part IV and conclusion. Illustrated. 2 1/2 pp. Wm. Paul Gerhard. American Architect, February 23.

Markets and Abattoirs. Advantages of public establishments, and discussion of sanitary features. Illustrated. W. P. Gerhard. 2 pp. American Architect, February 2.

Abattoir at Barry, England. Plan, dimensions, etc. Illustrated. 1 1/2 pp. Local Gov't Officer, February 9.

Slaughter House Problem. A German solution. Description of the method of municipal control. Robert C. Brooks. 22 pp. Yale Review, February.

"Public Cleanliness." 1/2 p. American Homes and Gardens, February.

Abolishing Poles in the Streets.—By J. Horace McFarland. 1 p. Illustrated. Ladies' Home Journal, February.

Smoke Prevention in Central Power Stations.—Impossibility of this claimed under rapid load fluctuations. Scientific discussion, with diagrams. Dr. Chas. E. Lucke. 6 pp. Power, March.

Clean Milk.—"The Milk Crusade," Editorial. 1/2 p. "Pure Milk in Washington." Letter. 1/4 p. Charities and the Commons, February 9.

Garden Cities.—"A Very Significant Movement." The Garden Cities Association of America. 1 1/2 pp. The Village, February.

Suburbs.—"A Complete Small Suburban House." By Henry G. McMurtie. 1 p. Illustrated. Ladies' Home Journal, February.

"How to Fit a Garden to a House." By Frances Duncan. 1 p. Ladies' Home Journal, February.

Planning Towns and Cities in Germany.—Abstract of Prof. Baumeister's report on the revised principles of the Incorporated Society of Architects and Engineers. Frank R. Durham. 2 pp. The Surveyor, January 25.

Mosquito Conditions in the Bronx.—Report on these by Henry Clay Weeks. Illustrated. 1 3/4 pp. Municipal Journal and Engineer, February 20.

Drawings, Making, Indexing and Filing.—Paper before Illinois Society of Engineers and Surveyors. By J. J. Harmon. Illustrated. 2 pp. Engineering Record, February 16.

Card Indexing Engineering Periodicals.—Lecture before Cornell students by Prof. H. W. Hibbard. 3 1/4 pp. Technical Literature, February.

Municipal Engineering in England.—Review of work done during 1906, divided into Electrical, Buildings, refuse Disposal, Roads and Bridges, Sewerage and Sewage Disposal, Tramways, and Water Supply. The best review we have seen anywhere. 22 pp. The Surveyor, January 25.

Sewage, Water Supply and Drainage of New Orleans. Outline of project and work already done. Geo. G. Earl. Illustrated. 2 1/2 pp. Engineering World, February 15.

Concrete Construction, Forms For.—Thoroughly practical description of forms for sewers, buildings and other structures. Illustrated. Sanford E. Thompson. 6 pp. Concrete, February.

THE WEEK'S CONTRACT NEWS

Relating to Municipal and Public Work—Street Improvements—Paving, Road Making, Cleaning and Sprinkling—Sewerage, Water Supply and Public Lighting—Fire Equipment and Supplies—Buildings, Bridges and Street Railways—Sanitation, Garbage and Waste Disposal—Police, Parks and Miscellaneous—Proposals and Awards

BIDS ASKED FOR

STATE	CITY	RECEIVED UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
Street Improvements				
Missouri	Kansas City	March 7, 11 A.M.	Granitoid walks, 20 contracts; curb, 10 cont's	E. A. Harper, City Engineer.
Indiana	Van Buren	March 7, 11:30 A.M.	Constructing 7,915 ft. gravel road	James L. Burns, Co. Aud. Brazil.
Indiana	Winchester	March 7, 1 P.M.	Grade and pave, crushed stone, 13 miles	Mack Pogue, County Auditor.
New Jersey	Jersey City	March 7, 4 P.M.	Repairing roadway Hudson Boulevard	Walter O'Mara, Clerk Freeholders.
Indiana	Columbus	March 7	Constructing 2½ miles gravel road	J. M. Davis, County Auditor.
Illinois	Nashville	March 7	Brick paving, to cost \$8,250	P. Ziegel, Mayor.
Indiana	Indianapolis	March 7	Grade, pave and repair 40,000 ft. 3 roads	Mack Pogue, Co. Auditor
Wisconsin	Two Rivers	March 7	Improving 1,018 ft. Williams Street	Board of Public Works.
Ohio	Newark	March 7	Constructing State highway	Sam Huston, Columbus, Com'r.
Indiana	Valparaiso	March 8	Laying cement curb and gutter on 3 streets	Robert Ewing, City Clerk.
Indiana	Princeton	March 8	Constructing 11 miles of gravel road	Harry Embree, Co. Auditor.
Ohio	Marysville	March 8	Paving State and Mill Sts., 50 and 36 ft. wide	J. C. Kennedy, Village Engineer.
Indiana	Greenfield	March 9	Paving and cement walks, South Franklin St.	O. O. Bever, City Clerk.
Ohio	Cleveland	March 9	Grading, draining and paving two roads	A. B. Lea, County Engineer.
Washington	Seattle	March 9	Grading Fourth Avenue and cross streets	R. H. Thomson, City Engineer.
Minnesota	Duluth	March 10	Paving Jefferson St., tar, macadam or asphalt	City Engineer.
Indiana	Clinton	March 11, 10 A.M.	Building 24 miles, and 3,497 ft. gravel, 14 rds.	H. T. Payne, County Auditor.
Ohio	Toledo	March 11, noon	Grading and paving three streets	Reynold Voit, Sec'y B. P. S.
Ontario	St. Catharines	March 11, noon	Paving sts. with brick, asphalt, etc.	D. Benzie, City Engineer.
Michigan	Adrian	March 11	Paving 24,250 yds. asphalt, 9,665 yds. excav., 13,550 ft. concrete curb and gutter, 17 catchbasins, 50 inlets, etc.	John Mawdsley, City Clerk.
Ohio	Bellefontaine	March 11	Paving West Columbus Avenue	Board of Public Service.
Pennsylvania	Titusville	March 11	23,800 yds. paving, 11,514 ft. curb, etc., Main Street	H. A. Holstein, City Engineer.
Wisconsin	Fond du Lac	March 12, 2 P.M.	9,073.54 yds. tar macadam pavement, 5,200.54 ft. combined curb and gutter, Park Avenue	L. A. Pettibone, City Engineer.
New Jersey	Camden	March 13, 11 A.M.	Macadam, 1.78 miles, Cove rd., Merchantville	J. J. Albertson, Co. Engineer.
New York	Brooklyn	March 13, 11 A.M.	Repairing asphalt pavements, etc.	Bird S. Coler, President.
Ohio	Painesville	March 14, noon	Paving 27,000 sq. yds., 4 sts. with brick; also 14,370 lin. ft. stone curb	H. P. Cummings, City Engineer.
New York	Watertown	March 14, 5 P.M.	Paving 21,000 sq. yds., 5 sts., curbs, catch basins, etc.	Henry E. Baker, City Engineer.
Utah	Salt Lake City	March 14	Paving, macadamizing, repairing pavements, curbs and gutters; all materials; cost, \$515,000	L. O. Kelsey, City Engineer.
Pennsylvania	Harrisburg	March 15	Constructing 17,100 ft. road, 16 ft. wide	Joseph W. Hunter, Highway Com'r
Iowa	Waterloo	March 16	Road work in Bennington township	County Commissioners.
Nebraska	Omaha	March 16	Paving 7,100 sq. yds. of Military Road	D. M. Haverly, Clerk.
New York	Port Chester	March 18, 8 P.M.	3,300 yds. exc., 8,300 yds. wood pavement, 2,400 ft. curb, 2,380 yds. brick, 600 ft. vit. pipe drains, and 2,557 yds. macadam	C. D. Camp, Village Clerk.
Ohio	Cleveland	March 18	Curb, drain and pave North Ridge road	Julius C. Dorn, County Clerk.
Ohio	New Philadelphia	March 18	Constructing State highway	Sam Huston, Columbus, Com'r.
Indiana	Columbus	March 18	Asphalt paving, 12,700 sq. yds., Franklin St.	Wm. H. Rights, City Engineer.
Wisconsin	La Crosse	March 20	Laying 40,000 sq. yds. granite top macadam; 2,700 yds. brick; 9,220 yds. creosoted block	W. S. Woods, City Engineer.
Ohio	Steubenville	March 25	Paving Lincoln Ave. with brick; also concrete wall	T. W. Vance, City Clerk.
Water Supply				
Utah	Salt Lake City	March 7, 11 A.M.	Constructing 12,004 ft. 36- and 30-in. continuous wooden stave or c. i.; and 4,860 ft. 12- to 30-in. c. i. pipe; relay 3,300 16-in. pipe, valves, etc.	Louis C. Kelsey, City Engineer.
Virginia	Port Monroe	March 7, noon	Constructing water distributing system	Capt. R. H. C. Kelton, Q. M.
Manitoba	Winnipeg	March 7, noon	Two steel caissons, 15 x 43 ft.	M. Peterson, Sec'y Bd. Control.
New York	New York	March 7, 3 P.M.	Laying water mains in Central Park	Moses Herrman, Pres. Park Board.
Ohio	Elyria	March 8	Furnishing 20 tons of lead pipe	R. Moriarty, Clk. Bd. Pub. Ser.
Ohio	Springfield	March 8	Pipe, cement work, etc.; 12 lettings	W. H. Sieverling, City Engineer.
Ohio	Cleveland	March 11, noon	Furnishing 520 c. i. valves, 4 to 24 in.; also for 6,000 stopcock boxes	A. R. Callow, Sec'y Bd. Pub. Wks.
Michigan	Detroit	March 13, noon	Furnishing c. i. pipe, water gates, corporation cocks, and special castings for Water Dept.	Wm. B. Thompson, Mayor.
New York	New York	March 13, 2 P.M.	Furnishing c. i. castings; remodeling Ridge-wood pumping station; coal-weighing scales	John H. O'Brien, Water Com'r.
Iowa	Osceola	March 14, 8 P.M.	Constructing extension 4,000 ft. 6-in. pipe, 300 ft. 4-in., 8 Ludlow hydrants, 2 Eddy-valves	W. N. Temple, City Clerk.
Texas	Fort Worth	March 15, 2 P.M.	Two 3,000,000-gal. high-duty pumps	H. L. Calhoun, Supt. W. W.
Manitoba	St. Boniface	March 15, 5 P.M.	Supplying 25 hydrants	Theo. Pertrand, Mayor.
Colorado	Ault	March 15	Constructing \$30,000 water works	Engineer Shattuck, Greeley.
New York	New York	March 18, 2 P.M.	Constructing 10.73 miles Catskill Aqueduct; 1,058,300 yds. excavation; 256 yds. concrete masonry; 340,000 bbls. Portland cement, 125,000 lbs. steel, etc.	J. Waldo Smith, Ch. Eng'r, Bd. W. S.
Indian Territory	South McAlester	March 18	Constructing water and sewer ext.; cost, \$25,000	George Wilcox, City Engineer.
California	California City Point	March 19, 10 A.M.	Constructing pumping plant; Schedule 400	Bureau of Supplies and Accounts.
Saskatchewan	Saskatoon	March 20	Pipe laying, 20,000 ft. trenching; concrete foun. and housing for water tower; sedimentation basin	Navy Dept., Washington, D. C.
Wisconsin	West Salem	March 21	Constructing system, inc. concrete reservoir, pipe line, gasoline engine and pumps and brick work	Willis Chipman, Toronto, Ch. Eng'r
				O. Claussen, St. Paul, Engineer.

Water Supply—Continued

Wisconsin	Alma Center	March 22, 7:30 P.M.	Constructing 6,000 ft. 4, 6 and 8-in. c. i. pipe, specials, etc.; also for 300-gal. pump, 16 h.p. gasoline engine, 40,000 gal. tank on 30-ft. tower, 8-in. well, 400 ft. deep.	J. T. Duxbury, Village Clerk. John Caulfield, Sec'y Water Comrs. Fred T. Crane, City Engineer. H. H. Rousseau, Navy Dept., Washington, D. C. Shelby Taylor, Mayor.
Minnesota	St. Paul	March 25, noon	25 tons extra strong 4 to 14-in. lead pipe.	
New Jersey	Orange	March 25	Pumps for the water system.	
Colorado	Fort Lyon	March 30, 11 A.M.	Constructing 100,000 gal. steel water tank.	
Louisiana	Crowley	April 2, 6 P.M.	Constructing 20,000 ft. 6-in. mains.	

Sewerage

Missouri	Kansas City	March 7, 11 A.M.	Constructing sewers, Dist. 9; also in Joint Dist.	E. A. Harper, City Engineer. R. L. Gorman, Clk. Bd. Pub. Wks. R. Moriarty, Clk., Bd. Pub. Ser.
Minnesota	St. Paul	March 7, 2 P.M.	Constructing sewers, Grand and Paschal Aves.	
Ohio	Elyria	March 8	Constructing sewers in several streets.	
Illinois	Decatur	March 9, 2 P.M.	Constructing 2.75 miles 36 to 60-in. reinforced concrete sewers; cost, \$77,743.	A. B. Alexander, City Engineer. L. L. Crumrine, Sec'y Bd. Pub. Serv. G. R. Acker, Dir. Dept. Pub. Wks. W. W. Wise, Bd. Pub. Works.
Ohio	Lima	March 9	Constructing 12-in. sewer in S. Baxter St.	
Pennsylvania	Scranton	March 9	Constructing lateral sewers, several streets.	
Iowa	Des Moines	March 11, 11 A.M.	Laying 594 ft. 12-in. vit. pipe sewer, E. 5th St.	
South Dakota	Aberdeen	March 11, 8 P.M.	Constructing 600,000-gal. septic tank of reinforced concrete.	F. W. Raymond, City Auditor.
Iowa	Ottumwa	March 11, 8 P.M.	3,680 ft. 9, 8 and 7 ft. reinforced concrete sewer, 1,270 ft. 5-ft. brick or vit. block sewer; 8-ft. brick and stone trunk sewer; also trunk extensions.	C. R. Allen, City Engineer.
Illinois	Cairo	March 12, 10 A.M.	Constructing 9,699 ft. concrete main sewers, etc.	W. B. Thistlewood, City Eng'r.
Wisconsin	Fond du Lac	March 12, 2 P.M.	Laying 535 ft. 10-in., 633 ft. 12-in. and 630 ft. 15-in. storm sewer pipe, 3 sts.	I. A. Pettibone, City Engineer.
Pennsylvania	Sayre	March 12, 7:30 P.M.	Constructing trunk line sewer; 4,400 ft. 24-in., 1,060 ft. 20-in., 560 ft. 18-in. pipe.	H. H. Mercereau, Boro. Clerk. W. W. Wise, Chm. B. P. W.
Iowa	Des Moines	March 12	Constructing 13,155 ft. 8 to 24-in. pipe sewer.	H. P. Cummings, City Eng'r.
Ohio	Painesville	March 14, noon	Constructing 4,560 ft. 8 to 18-in. pipe, 3 sts.	George Schroeder, City Clerk.
Iowa	St. Bernard	March 14	Constructing sewers in certain streets.	Dr. J. L. Weber, Chm. Comrs.
Kentucky	Winchester	March 15	Constructing \$40,000 sewerage system.	C. C. Jenkins, Village Clerk.
Ohio	Willoughby	March 18	Constructing main sewer No. 1.	John P. Winters, City Engineer.
Iowa	Burlington	March 18	Constructing sewers in certain streets.	J. Edward Rowe, City Clerk.
New Jersey	Summit	March 19, 8:30 P.M.	Two pumping engines, cap. 1,500,000 gal. capacity each.	
New York	White Plains	March 20, 2:30 P.M.	Constructing 12 miles 3 to 6 ft. reinforced concrete circ. sewer, also 3 miles 6½ to 8½ ft. circ. concrete-lined tunnel.	Frank N. Glover, Sec'y Bronx Valley Sewer Commission.
Kansas	Pittsburg	March 20, 5 P.M.	Constructing 31,020 ft. 10 to 21-in. vit. pipe sewer, manholes, etc.	N. E. Wood, City Clerk. Fred T. Crane, City Engineer.
New Jersey	Orange	March 25	Pumps for sewage pumping station.	T. W. White, City Engineer.
Pennsylvania	McKeesport	April 1	Two 6-ft. sewers, each 3 miles long.	F. I. Consaul, City Engineer.
Ohio	Toledo	April 1	Constructing sewer system; cost, \$40,000.	
Louisiana	Crowley	April 2, 6 P.M.	Constructing sewer system, inc. 57,460 ft. 8 to 18-in. pipe, 24 flush tanks, 64 manholes and pumping station with electric pumps.	Shelby Taylor, Mayor.

Public Buildings

Pennsylvania	Carlisle	March 8, 2 P.M.	Complete hospital building, Indian School.	Maj. Wm. A. Mercer, Superintendent.
Georgia	Dahlgren	March 9, 6 P.M.	Constructing dormitory, N. Ga. Agr. College.	Rufe H. Baker.
Indiana	Hillsburg	March 9	Erecting 2-story and basement school.	Jos. Foreman, Trustee.
District of Columbia	Washington	March 9	Building 8-room school in Anacostia.	H. B. F. Macfarland, Comr.
Ohio	Cleveland	March 10	Bldg. Technical high school; cost, \$250,000.	F. S. Barnum, Supt. Bldgs., B. E.
New York	New York	March 11, 11 A.M.	Erecting 5 portable school houses; also alterations 3 buildings.	C. B. J. Snyder, Supt. Buildings.
Illinois	Chicago	March 11, 1:30 P.M.	Reinstallation of triplex pump, building watermains and rearrangement elevators County Hospital.	Wm. McLaren, Supt. Pub. Service. J. H. Dingle, City Engineer.
South Carolina	Charleston	March 11	Erecting \$60,000 police station.	Heman Dyer, City Clerk.
California	Pasadena	March 12, 9 A.M.	Wiring and repairs to engine house.	B. T. Galloway, Chm. Bldg. Com.
District of Columbia	Washington	March 12, 2 P.M.	Bldg. power house, U. S. Agricultural Dept.	D. H. Woodbury, Boston, Arch.
Massachusetts	Chelsea	March 12, 10 A.M.	Two buildings, officers' quarters, Naval Hosp.	
Illinois	Chicago	March 12, 4 P.M.	Building range of greenhouses, Garfield Park, 230-302 ft. long, 25-60 high, 50-80 ft. high.	West Chicago Park Comrs.
Nebraska	Genoa	March 13, 2 P.M.	Workshop, office bldg. and Supt.'s residence.	Wm. H. Winslow, Supt. Indian Sch.
Washington	Spokane	March 14, 3 P.M.	Constructing Federal Building.	J. K. Taylor, Washington, D. C.
Connecticut	Bridgeport	March 14, 8 P.M.	Erecting new fire station, Maplewood Ave.	D. C. Hall, Clk. Fire Comrs.
West Virginia	Wheeling	March 15, 11 A.M.	Building 8 lock houses and out buildings.	Capt. F. C. Boggs, U. S. Eng'rs.
Ohio	Toledo	March 15, noon	Eight-room addition, Spring St. school.	L. I. Donat, Clk. Bd. Education.
Missouri	St. Louis	March 15	Erecting hosp. at Quarantine; 63x150 ft., 3 stories and basem't, fireproof, cost \$65,000.	Board Public Improvement. Clerk Board of Education.
Ohio	Cincinnati	March 18, noon	Remodeling two school buildings.	W. F. Muenzenmayer, Secretary.
Kansas	Junction City	March 19	Constructing public library building.	E. A. Hitchcock, Sec. Int. Dept.
District of Columbia	Washington	March 20, 2 P.M.	Remodeling plumbing Gov. Hosp. for Insane.	
Ohio	Akron	March 21, 10 A.M.	Electrical fixtures, hardware and exterior approaches for new Court House.	J. C. Frank, Sec'y Building Com'n.
New York	New York	March 21, 3 P.M.	Installing plumbing and drainage apparatus, new Public Library; security, \$30,000.	N. Y. Park Board.
Michigan	Owosso	March 21	Constructing, complete, U. S. Post Office.	J. K. Taylor, Washington, D. C.
South Carolina	Charleston	March 23, 11 A.M.	Officers' quarters and dispensary building.	Bureau of Yards and Docks, Navy Dept., Washington, D. C.
Wisconsin	Green Bay	March 23, 3 P.M.	Constructing Post Office and Court House.	J. K. Taylor, Washington, D. C.
Illinois	North Chicago	April 1, noon	Bldgs at Naval Training Station.	Jarvis Hunt, Chicago, Architect.
North Dakota	University	April 1, 10 A.M.	Library bldg. State Univer'y, cost, \$60,000.	Patton & Miller, Chicago, Ill., Archs.
Ohio	Marion	April 1	Four-story addition to school; cost, \$10,000.	Geo. B. Christian, Jr., Clerk Bd. Ed.
District of Columbia	Washington	April 3	Furnishing plumbing fixtures H. R. Bldg.	Elliott Woods, Supt. Capitol.
Illinois	Carthage	April 9, 2 P.M.	Erect'g new Co. Court House; cost, \$115,000.	J. W. Westfall, Co. Clerk.

Bridges

Oregon	La Grande	March 7, noon	150-ft. span steel bridge on concrete piers; also 75-ft. span steel or wood comb. bridge.	J. B. Gilham, County Clerk.
California	San Diego	March 7, 2 P.M.	Constructing bridge over Carlsbad Creek.	Wm. H. Francis, County Clerk.
Kansas	Eldorado	March 7	70-ft. steel span bridge and stone pier.	W. H. Clark, County Clerk.
Illinois	Metamora	March 7	Constructing iron bridge, concrete backing.	James Hall, Town Clerk.
New Jersey	Hoboken	March 7	New viaduct, 14th St., and roads connecting.	Walter O'Mara, Clerk County Freeholders, Jersey City.
Ohio	Cleveland	March 9, 11 A.M.	Concrete arch culvert; also steel bridge.	A. B. Lea, County Surveyor.
Virginia	Petersburg	March 11, noon	Erecting steel bridge over Appomattox river.	R. D. Budd, City Engineer.
Ontario	E. Zorra, Hickson, P. O.	March 11, 3 P.M.	Truss span br. 70 ft. and 3 beam span 24 ft.; concrete floors and channel guards.	James Anderson, Town Clerk.
California	Napa	March 12, 10 A.M.	Building stone masonry arch bridge.	Board of Supervisors.
North Dakota	Grand Forks	March 12	Building wood and steel bridges in County.	President Hunter, Co. Comrs.
New Jersey	Camden	March 13, 11 A.M.	Superstructure, 06 ft. long, for through truss highway bridge at Clements Bridge.	J. J. Albertson, County Engineer.
Iowa	Des Moines	March 13, 11 A.M.	Constructing brick culvert, Forest Ave.	W. W. Wise, Chm. Bd. Pub. Wks.
New York	New York	March 14, 2 P.M.	Alteration steel viaduct and masonry approach and bldg. bridge and tunnel entrances, Williamsburg bridge.	J. W. Stevenson, Bridge Comr. H. M. Payne, Ch. Engr. Mingo Coal Co.
West Virginia	Williamson	March 15	Building steel bridge 580 ft. long, 60 ft. high.	

Bridges—Continued

Ohio	Dayton	March 16	Two concrete abutments and concrete pier...	T. J. Kauffman, County Auditor
Ohio	Mount Vernon	March 16	Constructing concrete bridge over Center Run	E. M. Parmenter, Clerk.
Ohio	Chillicothe	March 18, noon	Building steel bridge, 57 ft., 8 in. long, 16 ft. roadway, cap. 125 lbs. per sq. ft., concrete floor	Charles H. Pinto, Co. Auditor.
Manitoba	Shellmouth	March 19	Constructing steel superstructure of bridge	J. G. Sing, Toronto, Engr.
Manitoba	Dauphin	March 20, noon	Two 60-ft. steel span bridges and wooden 60-ft. span Howe truss bridge	J. A. Cordy, Clerk.
South Carolina	Yorkville	March 20	Steel wagon bridge, 2 spans, 80 ft. each, cap. 25,000 lbs.	T. W. Boyd, Supervisor.
California	Salinas	April 1, 2 P.M.	Bridge, 1,004 ft. long, 500 ft. Pratt trusses, Chualar; also one 1,880 ft. long, 1,100 ft. trusses, San Ardo; pile trestle approaches.	Lou G. Hare, County Surveyor
Mississippi	Greenwood	April 1	Building bridge 300 ft. long	C. W. Crockett, Chancery Clerk
Louisiana	New Orleans	April 20, 1 P.M.	Constructing viaduct in Algiers	Charles R. Kennedy, Comptroller.

Miscellaneous

Kansas	Fort Leavenworth	March 7, 11 A.M.	Complete fire-alarm telegraph system	Capt. J. E. Normoyle, Q. M.
Mississippi	Natchez	March 7, 4 P.M.	Lighting for 10 years, from March 7, 1908	S. B. Stewart, Chm. Light Com.
New York	Yonkers	March 7, 8 P.M.	Erecting chimney 110 ft. high, 5-ft. diameter	John J. Devitt, Pres. Water Comrs.
California	Pasadena	March 12, 9 A.M.	Furnishing hose-wagon with modern eq't.	Heman Dyer, City Clerk.
Montana	Huntley	March 12, 3 P.M.	Furnishing 55,000 bbls. Portland cement	U. S. Reclamation Service.
New York	New York	March 13, 10:30 A.M.	Furnishing underground and submarine cable	F. J. Lantry, Fire Com'r.
Ohio	Lakewood	March 13, noon	Furnishing, etc., 180 450-watt electric arc lamps, all night and every night; also moonlight schedule for ten years	B. M. Cook, Village Clerk.
New York	New York	March 14, 3 P.M.	Erecting storage beds, manure pit and refuse incinerator in Central Park, 97th St.	Moses Herrman, Park Dept.
Massachusetts	Boston	March 18, 2 P.M.	Furnishing and erecting machinery for operating two rolling cannon lock gates	Charles River Lock Basin Com'n.
Ontario	Ottawa	March 19, noon	Mounted police clothing supplies	Fred White, Comptroller.
Iowa	Des Moines	March 20	Dredging, rip-rap work, concrete construct'n, etc., Des Moines and Raccoon Rivers; cost, \$200,000	George D. Dobson, City Engr.
Ohio	Akron	March 20	Extending city police and fire alarm system	Wm. H. Kroeger, Clerk, B. P. S.
Manitoba	Brandon	April 11, noon	Supplying 6,000 to 8,000 bbls. Port. cement	W. H. Shillinglaw, City Engr.

STREET IMPROVEMENTS

Stockton, Cal.—Council contemplates paving various business streets with asphalt.—R. C. Tunselty, City Engineer.

Trinidad, Col.—Council will advertise for bids for the construction of many streets; brick on concrete foundation will be used.

Waterbury, Conn.—The Board of Public Works has recommended constructing sidewalks on the following streets: West Main, from west line of the Green to Naugatuck railroad tracks; estimated expense: vitrified brick, \$57,000; bitulithic, \$44,000. North Main, from Farm to Vine streets; brick, \$17,000; bitulithic, \$13,000. Farm, from North Main to Round Hill streets; brick, \$7,000; bitulithic, \$5,500. Prospect, from West Main to Grove streets; brick, \$13,000; bitulithic, \$10,200. Bishop, from North Main to Burton streets; brick, \$10,000; bitulithic, \$8,600. Elizabeth, from Bishop to North Main streets; brick, \$6,500; bitulithic, \$5,900. East Main, from Center to Wolcott; brick, \$35,500; bitulithic, \$27,100. Also for the laying of sidewalks in the following streets: North Willow street, from the north line of Plaza avenue to Roseland avenue; Benedict street, west side, from No. 32 to line with south side of Jewelry street; Baldwin street, both sides, from north line of Meadow street south to Pearl Lake road; Round Hill street, both sides, from terminus of sidewalk southerly to Camp street; Fairview street, west side, from Johnson street northerly 200 feet; River street; Roseland avenue, both sides; North Willow to Columbia avenue.

Clarksville, Ga.—The citizens have voted \$5,000 bonds for macadamizing streets.

Joliet, Ill.—The City Engineer has been directed to prepare plans for paving certain streets and construct sewers.

Moline, Ill.—Council proposes to expend \$20,000 in paving certain streets.

Ottawa, Ill.—The Board of Local Improvement has passed a resolution to pave certain portions of East Ottawa street with brick on a concrete foundation; estimated cost, \$92,000.

Quincy, Ill.—The Board of Local Improvements is considering paving Tenth street, from south line of Oak street to north line of Sycamore avenue, to a width of 40 feet. It is also contemplated to pave Tenth street from south line of Oak to north line of State street, to a width of 36 feet.—F. L. Hancock, City Engineer.

Rockford, Ill.—The Board of Public Improvements has decided to pave certain portions of Eleventh Street.

Crawfordville, Ind.—The Chairman of Public Improvements has directed the City Engineer to prepare plans for sanitary sewer and for paving Wabash avenue.

Elkhart, Ind.—The Board of Public Works will likely decide to pave Franklin street its entire distance. The material has not been determined on.

Franklin, Ind.—City Engineer Seller is preparing plans for paving West Jefferson street.

Petersburg, Ind.—The proposition to issue \$35,000 bonds for construction of roads in Patoka township carried; contract for work will be let at once.

Tulsa, I. T.—All bids received, February 15, for paving twenty-five blocks with brick or asphalt were rejected; it is probable the work will be readvertised within the next sixty days.—W. D. Abbott, City Recorder.

Davenport, Ia.—Council is preparing to pave certain portions of Division street.

Ashland, Ky.—An ordinance has passed Council providing for paving certain streets; estimated cost, \$75,000.

Louisville, Ky.—Vitrified brick pavements will be constructed in Mulberry to McHenry, Schiller, from Dandridge to Struck, and Dandridge, from St. Catherine to Schiller.

Flint, Mich.—The city will issue bonds to the amount of \$8,200 for the construction of sidewalks.

Hancock, Mich.—The estimated cost of paving Quincy street is \$36,000; the cost will be shared by the city and the street railway company; bids are invited.

Austin, Minn.—Council has decided to advertise for bids for paving certain portions of Water street.

Crookston, Minn.—The Improvement Board is arranging to pave certain portions of Elm street.

Grand Forks, Minn.—Council is arranging to pave certain streets in the city.

Vicksburg, Miss.—Council has been petitioned for paving nineteen blocks of Grove avenue.

Newark, N. J.—The City Engineer has been directed to prepare plans and specifications for paving many streets.—M. R. Sherrerd, City Engineer.

Rochester, N. Y.—Council is arranging to pave certain portions of Lake avenue.

Lexington, N. C.—Council has issued \$40,000 bonds for street improvements.

Akron, O.—Council has approved plans and specifications for paving with stone, State, Center, Quarry and Church streets, from Main to Broadway, and has directed that plans and specifications be prepared for paving Sherman street and laying sewers in North Amherst street and Russell avenue.

Barberton, O.—Council has decided to pave certain portions of Yards street.

Canton, O.—City Engineer Sarver estimates the cost of paving Navarre street, a distance of one mile, at \$57,000; the construction of a large number of sidewalks and curbs is also to be undertaken this spring.

East Liverpool, O.—Council has decided to pave Grant street as soon as the sewer work on that thoroughfare is completed.

Glandorf, O.—Bids will be received, March 25, for the purchase of \$9,000 5 per cent. street improvement bonds.

Marietta, O.—City Engineer Cole is getting prices on stone for curb and cement curb and is making estimates on the cost of paving about 500 feet of Gendale street.

Miamisburg, O.—Bonds, \$10,000, for improving Pearl street, have been issued; Council will take up the petition of residents for the paving of Central avenue.

Springfield, O.—Estimates are being prepared for paving W. Hain and Clifton streets, including curbing and guttering.—W. H. Sieverling, City Engineer.

Staubsville, O.—Council of the village of Mingo will probably engage an engineer for the preparation of plans for sidewalks and for other municipal improvements during the coming season.

Wauseon, O.—Heffner & Son, of Cellna, will probably get the contract for paving North Fulton street at \$13,900.

Youngstown, O.—Council has passed a resolution declaring it necessary to construct a sewer in Bell avenue from the north line of city lot No. 5,497 to Crescent street; in Crescent street, from Parkwood avenue to Manning avenue; in St. Clair avenue, from

lot No. 9,380 to Crescent street; in Central avenue, from Crescent street to the Erie Railroad branch track; in Parkwood avenue, from the north line of city lot No. 5,501 to Manning avenue; in Manning avenue, from Crescent street to Caldwell street; in Caldwell street, from Ardale street to Eagle street; in Wells street, from Manning avenue to Hezlep street; in Hezlep street, from Wells street to the Lake Erie and Eastern right of way; thence from Hezlep street along the Lake Erie and Eastern Railroad Company's right of way across the P. C. & T. R. R. and P. Y. & A. R. R., and along the right of way of the P. Y. & A. R. R. to the end of the main sewer in West avenue.—F. L. Baldwin, Mayor.

Newcastle, Pa.—The paving of Sheridan avenue with brick has been determined on, and bids for this improvement are about to be advertised.

Anderson, S. C.—The matter of issuing \$75,000 bonds for street improvements will be submitted to a vote of the people.

Robertson, Tenn.—An election will be held, March 16, to decide the question of issuing bonds for county roads.

Dallas, Tex.—Special Engineer Curil M. Erwin has submitted plans and specifications to the Park Board for laying about 1½ miles of paving at a cost of \$30,000, in addition to curb and gutter in Fair Park; bids are invited on bitulithic sheet asphalt, rock asphalt, brick and macadam, also for concrete curb and gutter.—M. N. Baker and Judge J. J. Eckford, Park Board. Council is considering the paving of Ross avenue and a number of other thoroughfares.—Address Mayor Smith.

Orange, Va.—The Orange County Board has voted \$25,000 bonds for roads.

Seattle, Wash.—Plans and specifications are being made for paving many streets.

Spokane, Wash.—Olive avenue is to be paved with "Oilroid," a new pavement invented by H. L. Lillenthal, of this city.—Charles McIntyre, City Engineer.

Wheeling, W. Va.—Council has under consideration the matter of expending \$500,000 improving streets.

De Pere, Wis.—Council has decided to pave four blocks with brick; estimated cost, \$9,000.

SEWERAGE

Dundee, Ill.—The city will vote, April 16, on the construction of sewers in West Dundee; according to preliminary plans by Anderson & Schepow, Engineers, Elgin, Ill., the cost of the system is estimated at \$41,000.

Elkhart, Ind.—The paving of Second and Franklin streets has been agreed to, and City Engineer A. M. Smith has also prepared plans for the Indiana trunk line sewer and the South Main street sewer. It is planned to construct several miles of paving and sewer this spring.

Indianapolis, Ind.—Tentative plans are being prepared by the City Engineer for a sewer system to drain that section of the city lying between the old line of the Michigan division of the Big Four Railroad and the canal, east and west, and between Tenth and Fifteenth streets, south and north.

Princeton, Ind.—Council is considering installing a sewer system, to cost about \$68,000.

Terre Haute, Ind.—The City Engineer has been directed to prepare plans for improving sewer system in the west district.

Ecorse, Mich.—Authority has been granted to the village to construct a system of sewers.

Houghton, Mich.—The village will vote, March 11, on the proposed issue of \$50,000 sewer bonds.

St. Paul, Minn.—Fowble & Fitz, Engineers, St. Paul, Minn., have made surveys for a sewer system in connection with the State Sanitarium for Consumptives at Walker.

Holdrege, Neb.—County Surveyor Billings is to make surveys for a sewer system for this city.

Cape May, N. J.—Citizens of West Cape May have held meeting to consider bonding the borough to obtain money for the construction of sidewalks and a sewerage system.

Bolivar, N. Y.—Plans and maps for the proposed sewer system have been accepted; a bond issue for the construction of this improvement will be authorized.

Dayton, O.—Plans are being prepared for a sewer system for North Dayton.

Elyria, O.—A system of sewerage in what is known as District No. 1 has been authorized.—Frank R. Fauver, City Clerk.

Portsmouth, O.—The City Auditor estimates that the cost of paving and sewer work to be done during the season will amount to \$130,000.

Springfield, O.—City Engineering Sieverling estimates the cost of the main interceptor of the high level sewer at \$40,000.

Lawton, Okla.—An election will be held to vote on an issue of sewer bonds.

Magnum, Okla.—The city has employed J. W. Ryder, Granite, Okla., to furnish plans and superintend the construction of a sewer system.

Johnsonburg, Pa.—The city has requested Horace Little, City Engineer, Ridgeway, Pa., to prepare plans for a more extensive sewer system.

North Wales, Pa.—The matter of issuing \$20,000 bonds for sewage disposal plant will be submitted to a vote.

Dallas, Tex.—A storm sewer of steel reinforced concrete not less than three and a half feet in diameter will be laid in Ross avenue, between Hall and Central, before the thoroughfare is paved; storm sewers will also be laid in Holmes and Bell avenues; property owners on Bennett avenue have asked for the extension of the sanitary sewer there.—Address Mayor Smith.

Milwaukee, Wis.—An ordinance has been passed providing for the construction of additional sewers in the west sewerage district.—Peter J. Koehler, Deputy Controller.

WATER SUPPLY

Prattville, Ala.—Bonds, \$30,000, will be voted for the erection of a water plant.

Pine Bluff, Ark.—The Waterworks Company is preparing to improve the water service.

Monrovia, Cal.—Bonds, \$50,000, have been voted for storage reservoir for water system.

Ault, Col.—Council will receive bids for the construction of a water plant.—O. S. Shattuck, Greely, Engineer.

Decatur, Ga.—Bids will be received for the labor and material for constructing a complete water system, including 460 tons of 6-inch iron pipe, two horizontal combination trucks and pumping engine and two 80-horsepower boilers and heaters.—E. H. Mason, Clerk.

Ft. Wayne, Ind.—Council has authorized an issue of \$25,000 bonds for improving the water system.

Sioux City, Ia.—F. W. Chappelin, of Minneapolis, Minn., is preparing plans for improvements to be made in the waterworks system; estimated cost, \$100,000.

West Branch, Ia.—All bids for the purchase of \$15,000 waterworks bonds has been rejected; the date of receiving new bids has not yet been decided.—P. O. N. Meyers, City Clerk.

Cassapolis, Mich.—The city has voted \$780 for additional pumping machinery for water plant; the contract has not yet been awarded.

Hamtramck, Mich.—The Legislature has granted permission to Council to extend the water system.

Aurora, Minn.—A second election will be held to establish the legality of the waterworks bonds.

Browersville, Minn.—The matter of establishing a water system is under consideration.

Chillicothe, Mo.—Plans are being prepared for water and lighting system; cost, \$100,000.

St. Louis, Mo.—The Maplewood Improvement Association has petitioned for improving fire protection.

Bloomington, Neb.—Bonds have been voted for the erection of a water plant.

Brockport, N. Y.—The matter of issuing \$185,000 waterworks bonds is under consideration.

Cortland, N. Y.—The matter of issuing bonds for establishing a municipal water plant will be submitted to the voters.

Lestershire, N. Y.—The Water Commissioners have decided to issue bonds for the purpose of buying a pumping plant.

Lenoir, N. C.—The citizens will vote on the question of issuing \$80,000 in bonds for the erection of a waterworks system.

Bellefontaine, O.—R. P. Dickinson, former Superintendent of the waterworks plant, states that \$10,000 will have to be expended at once to purchase a new air compressor, and that an engineer will be called in to consult with the Board as to other necessary repairs.

Bryan, O.—The citizens have voted \$30,000 bonds for water system; oil-consuming engines and electrical apparatus will be purchased.

Findlay, O.—The village of Arlington has voted \$15,000 bonds to buy the waterworks plant and improve it.

Geneva, O.—The powerhouse of the Geneva water plant was destroyed by fire; loss \$8,000; it will be rebuilt.

Coatesville, Pa.—The matter of issuing \$125,000 bonds for a gravity water system will be submitted to a vote of the people.

Stulton, Pa.—The citizens have voted \$85,000 bonds for a filtration plant.

Lake City, S. C.—J. L. Barringer, of Florence, has purchased \$16,000 6 per cent. 20-30-year water bonds at \$100.50.

Bristol, Tenn.—A bill authorizing Bristol to issue bonds to the extent of \$200,000 for waterwork purposes, has become a law; the Aldermen are now considering whether or not they will take advantage of it.

Mabton, Wash.—Council will vote on the question of issuing \$8,000 bonds for water system.

Port Angeles, Wash.—The citizens have voted in favor of issuing bonds for a municipal water and power plant; it is proposed to purchase the old partial system now in operation, and develop a new supply, with power works, and a new system for distribution.

Seattle, Wash.—Bids are invited, March 20, 10 a. m., for \$2,250,000 5 per cent. semi-annual water bonds.—H. W. Carroll, City Comptroller.

Galt, Ont.—The citizens have voted \$15,000 bonds to secure factories, and \$5,000 bonds to improve the water system.

LIGHTING AND ELECTRICITY

Birmingham, Ala.—The Birmingham Railway, Light and Power Company will materially add to its power house on Powell avenue, between Eighteenth and Nineteenth streets; the plans have been drawn and the appropriation made for these additions; a battery of boilers of 6,600 horsepower will be installed.

Huntsville, Ala.—The Huntsville Electric Light and Power Company is preparing to double the capacity of its plant, to cost \$49,000.—F. G. Dupont, president.

Yuma, Ariz.—The Yuma Electric and Water Company will double the capacity of its plant.

Colorado Springs, Col.—The question of issuing bonds for a municipal lighting plant will be submitted to the voters, April 2; the work of the construction of a power plant of the Empire Water and Power Company is to be pushed as soon as plans are completed and \$500,000 bonds have been sold.—G. A. Taff, president.

Jacksonville, Fla.—The big contract for the electrical illuminating and power plant for Dixieland has been awarded to the Florida Electric Company; the lighting scheme for the display calls for twenty thousand 4-candlepower incandescent lamps, and a motor service for roller coaster, circular swings, etc.

Augusta, Ga.—The Council of North Augusta has under consideration the establishment of an electric-light plant.

Bloomington, Ill.—The matter of improving the electric-light plant will be decided in May.

Edwardsville, Ill.—Since the purchase of the Tri-City Electric Light plant the McKinley syndicate has been considering the rebuilding of the plant and increasing its capacity.

Council Bluffs, Ia.—The Omaha Electric Light and Power Company will expend about \$50,000 for improvements.—H. A. Holdrege, Manager.

Davenport, Ia.—A petition is in circulation asking that the Council demand that the power used in lighting the city and the electricity also used be generated in Davenport; in other words, the petition asks that the company furnishing lighting to the city erect a plant in Davenport for the purpose.

Duncombe, Ia.—The citizens will vote on the question of issuing electric light bonds.—N. L. Parkin, City Clerk.

New Hampton, Ia.—Council is preparing to install a new lighting plant; the plant will be duplicated in part, having two dynamos, two engines and two boilers, and will be first-class in every detail.

Belleville, Kan.—Spitzer & Co., of Toledo, have purchased \$20,000 5 per cent. 20-year electric-light bonds at a premium of \$125.

Topeka, Kan.—A bill is before the Legislature authorizing an issue of \$100,000 bonds to establish a municipal lighting plant.

Fulton, Ky.—W. W. Meadow has petitioned

Council for franchise to establish electric plant.

Baton Rouge, La.—C. D. Wynon, the new President of the Baton Rouge Electric Company has notified the local manager that there will be \$500,000 spent in repairing and improving plant, and will be commenced early in spring.

Franklin, La.—Council will receive bids for purchase of additional equipment for the electric-light plant.

Crystal, Mich.—The municipal lighting plant is to be improved.—Q. Stevenson, Superintendent.

Detroit, Mich.—The appropriations for public lighting for the coming year are as follows: \$22,000 for installing overhead wires and lights; \$25,000 for arc lights to replace the Woodmere gas lights.

Manistee, Mich.—The Manistee Gas and Electric Company is planning to extend its lines in several blocks.—Frank J. Hunter, Manager.

Mason, Mich.—Council proposes to abandon the outgrown municipal electric-lighting plant and secure lighting from the Commonwealth Power Company, as the Kackson-Lansing lines run just outside the city.

Dawson, Minn.—Bids will be received, March 11, for the purchase of \$8,000 20-year 5 per cent. electric-light bonds.—Charles O. Holtan, Village Recorder.

Butte, Mont.—F. Augustus Heinze has petitioned Council for an electric-lighting franchise.

Kalispell, Mont.—Plans are being prepared by the Flathead Valley Water Power Company for improvements to the Big Fork Electric Power & Light Company; cost, \$50,000.

Eldorado Springs, Mo.—The Eldorado Springs Electric Company will improve its plant; a boiler and electric machinery will be purchased.—F. W. Hiatt, Manager.

York, Neb.—The York Gas and Electric Company proposes to enlarge its plant.—W. Fareck, Manager.

Media, N. Y.—The Niagara Falls Electric Transmission Company has received a franchise to furnish electric power to Media.

Spray, N. C.—The Rhode Island Company, Spray, N. C., wants high-speed engine to drive 200-kilowatt generator.

Tryon, N. C.—Public improvements of great importance are being rapidly carried out by the Tryon Electric Light and Power Company, which was incorporated by the General Assembly last month; the company is developing water power on the Pacolet river between Tryon and Melrose, which will afford about 3,000 electrical horsepower and is operating locally, both in Tryon and Saluda, under town franchises to furnish light and power to both communities.—Todd Russell, General Manager.

Grand Forks, N. D.—Council has received many petitions for additional electric lines; plans for extension of the electric-light plant are now being prepared. It may be necessary to erect an entirely new plant.

Athens, O.—The City Council will appropriate \$6,000 for improving the municipal light and power plant.

Bluffton, O.—The citizens are preparing to establish an electric-light plant.

Bryan, O.—The election on the question of a bond issue for electric-lighting plant has carried and the Board of Public Safety will authorize the construction of one of the best lighting and waterworks plants of any town of its size in the State.

Defiance, O.—The Auglaize River Power Company will erect a hydro-electric power plant near this town.—H. Von Schon, Wayne County Bank Building, Detroit, Mich., Consulting Engineer.

Susquehanna, Pa.—The Erie Railway Company is about to install an electric plant for the running of various machines by electricity.

Mitchell, S. D.—Council has granted the Mitchell Gas Company an extension for twenty years of its franchise, which expires in two years, in order that the plant may be bonded to secure money for improvements; another franchise is being sought by a local company and there may be competition in the lighting business.

Yankton, S. D.—The gas plant is to receive extensive improvements in the early spring; the new company will increase the capacity from 2,000 cubic feet per day to 15,000.

Trenton, Tenn.—Council has petitioned the Legislature for authority to issue \$20,000 bonds for electric-lighting.

Weyers Cave, Va.—The Weyers Cave Electric Company has prepared plans for the establishment of a power plant in the North river at Rockford, for the purpose of generating electricity.

Richmond, Va.—The Montague Manufacturing Co. wants plans and estimates and machinery for development of water-power and its transmission by electricity to individual motors for sash, door and blind factory.—J. L. Phippin, Secretary.

Peshigo, Wis.—Daniel W. Meade, of Chicago, is preparing estimates for a power plant for making and transmitting power to Menominee, Marinette, Green Bay and other cities.—Address C. H. Hartner, of Oshkosh.

FIRE EQUIPMENT

Glendale, Cal.—Council is preparing to expend \$5,000 for the purpose of fire apparatus.

Allensville, Ill.—Arrangements are being made to erect an engine house.

Pana, Ill.—Council has decided to erect a new fire house.

Rock Island, Ill.—The Bluff Improvement Association for fire houses has petitioned for the erection of a fire house in the subdivision.

Connelleville, Ind.—The West Side has petitioned for fire station.

Burlington, Ia.—Council has completed plans for the erection of a fire station, at a cost of \$25,000.

Abbeville, La.—A hose company has been organized in the northern portion of the town.—Frank Summers, Secretary.

Kalamazoo, Mich.—Council is considering the plans for a three-story fire house.

Greenbush, Minn.—The fire station has been destroyed by fire; it will be rebuilt.

Virginia, Minn.—Council is preparing to erect a fire hall and to purchase fire apparatus.

Kansas City, Mo.—The citizens of the Thirteenth ward have petitioned Council for a fire station to be equipped with modern fire apparatus.

Middletown, N. Y.—The purchase of a new steamer, new hook and ladder truck, and other fire apparatus has been decided on; \$8,500 will be asked for the purchase of this apparatus.

Poughkeepsie, N. Y.—The city will erect a new fire house, at a cost of \$12,000.

Troy, N. Y.—A hose company is being organized in the Bemen Park district; the company will be equipped with engine and other apparatus.

Watertown, N. Y.—The Board of Public Safety has purchased sites for the erection of two fire houses; \$40,000 will be expended.

Norwood, O.—Council decided to issue \$4,000 bonds for improving fire protection.

Nashville, Ore.—A volunteer fire company has been organized; apparatus will be purchased.

Ardmore, Pa.—Plans have been completed for the erection of a two-story fire station for the Merriam fire company; estimated cost, \$5,000.

Beeville, Tex.—The business men are raising money for the purchase of fire apparatus.

Montpelier, Vt.—A new hose company has been organized.—H. C. Kason, Leader.

Seattle, Wash.—A volunteer fire company has been organized.

Tekoa, Wash.—Council has appointed a committee to purchase fire apparatus.

PUBLIC BUILDINGS

Jonesboro, Ala.—Bonds, \$16,000, have been voted for school purposes.

Alhambra, Cal.—The City Trustees have decided to issue \$10,000 library bonds.

Los Angeles, Cal.—An election will be held to decide the question of issuing \$10,000 bonds for the erection of school house in Las Feliz school district, Los Angeles county.

Athens, Ga.—Council has petitioned Legislature for authority to issue \$500,000 school bonds.

Lagrange, Ga.—An election will be held to decide the question of issuing \$15,000 bonds for the erection of schoolhouse.—T. J. Hartwell, Clerk.

Caldwell, Idaho.—Bids will be received for erecting a City Hall; estimated cost, \$20,000.—J. T. Tourtelotti, Boise, Architect.

Cuba, Ill.—The citizens have voted bonds for erecting schoolhouse.

Mt. Ayr, Ia.—The proposition to issue school bonds will be submitted to a vote of the people, March 12.

Kansas City, Kan.—Bonds, \$200,000, have been voted for school improvements.

Benton Harbor, Mich.—The citizens have voted issue of \$25,000 bonds for school purposes.

Minneapolis, Minn.—The Legislature has granted the city permission to issue \$300,000 school bonds.

New Ulm, Minn.—Bonds, \$15,000, have been voted for erecting a schoolhouse.

St. Paul, Minn.—The Legislature has granted the city permission to issue \$800,000 school bonds.

St. Peters, Minn.—Bonds, \$8,000, have been voted to complete high school building.

Addison, N. Y.—The village will vote on appropriation of \$7,000 to complete the new City Hall.

Pleasant Ridge, O.—The School Board is preparing to issue \$18,000 bonds for the erection of schoolhouse.

East Cleveland, O.—Bids will be received, March 9, for \$34,000 school bonds.—H. F. Jordan, Clerk.

Darby, Pa.—The question of issuing \$30,000 bonds for school purposes will be submitted to a vote.

Macungie, Pa.—The citizens have voted \$7,000 bonds for the construction of Town Hall.

Meyersdale, Pa.—An election will be held to decide the question of issuing \$40,000 school bonds.

Canning, Tex.—A large school building will

be built.—O. G. Roquemore, Amarillo, Architect.

Cleburne, Tex.—An election will be held to decide the question of issuing \$75,000 bonds for erecting a schoolhouse.

Fountain Green, Utah.—An election will be held to decide the question of issuing bonds for the erection of an eight-room schoolhouse.

Greenacres, Wash.—An election will be held to decide the question of issuing bonds for school purposes.

Tekoa, Wash.—The citizens have voted bonds for the erection of a schoolhouse.

Menasha, Wis.—Council has passed an ordinance authorizing issue of \$5,000 library bonds.

Walla Walla, Wash.—Bids are invited, March 12, 2 p. m., for \$100,000 bonds, to acquire land and to erect a City Hall, jail and fire station.

STREET RAILWAYS

Oakland, Cal.—The Oakland Traction Company, a consolidation of the Oakland Traction Consolidated and other street railway companies, will issue \$12,000,000 bonds to improve, extend and reconstruct the entire system.

Belleville, Ill.—The Belleville Interurban Railway has been incorporated with a capital of \$100,000, for the purpose of building seven miles of electric railway.—A. Gundlach and R. W. Hofsemmer, Incorporators.

East Dubuque, Ill.—The Dubuque & Southwestern Wisconsin Electric road has been granted franchise to use the village streets.

Evanston, Ill.—The Chicago, Evanston & North Shore Electric Railway Company has been granted a fifty-year franchise by Council to construct a line on Torrence avenue, from its northern limits, through the city and out to Bowmanville, where it will connect with the proposed extension of the Northwestern elevated road.

Galena, Ill.—The Illinois & Western Railway has been granted a franchise to build an electric line.

Danville, Ind.—The new Circuit Traction line to be built in a circle around Indianapolis, covering a route of 170 miles and running through Noblesville, Lebanon, Danville, Martinsville, Franklin and Greenfield, all county seats of populous counties, is to be rushed to completion early this summer.—J. N. Crabb, President; E. C. Worth, Secretary and Treasurer.

Duncan, I. T.—Council has granted to W. N. Andrews a franchise for an electric car line; the company proposes to construct an interurban line between Lawton, Okla., and Sulphur, I. T.

Cedar Rapids, Ia.—The Cedar Rapids Street Railway Company contemplates an increase of capital and improvements in plant; estimated cost, \$100,000.—William C. Dowe, Manager.

Louisville, Ky.—The Henderson Traction Company has been formed with a capital stock of \$150,000; Samuel McDonald, of Louisville, Walter Schmidt, of Cincinnati, and C. C. Tennis, of Pittsburgh, Pa., are interested.

Nicholasville, Ky.—The Fiscal Court has granted a franchise to the Central Kentucky Traction Company to run an interurban line to Lexington.

Yazoo City, Miss.—Kirkpatrick and Johnson, Civil Engineers, are preparing plans for the proposed electric road.

Bethlehem, Pa.—If the trolley scheme, now being promoted by Bethlehem, Nazareth and Stroudsburg capitalists, be carried out, there will be a direct trolley line from Philadelphia to Delaware Water Gap; the company will be known as the Stroudsburg & Wind Gap Street Railway Company.—J. B. Williams, Stroudsburg, President.

Elwood City, Pa.—The People's Street Railway Company has been incorporated with a capital stock of \$10,000 to build two miles of electric lines.—James Campbell, President.

Kenneth Square, Pa.—The Kenneth Coatesville Railway Company has been chartered with a capital stock of \$120,000, to establish a trolley line from Kenneth Square and Coatesville, a distance of twelve miles.—J. Walter Taylor, President.

Pittston, Pa.—The Hughestown Borough Council has been petitioned to grant franchise to the Pittston and Avoca Street Railway Company, a new corporation to be allied with the interests that control the Wyoming Traction Company, allowing the company to lay tracks, erect poles, string wires and operate cars on Parsonage street, for the whole length of the borough; the petition was presented by Attorney A. T. Walsh, representing the company.

Pottstown, Pa.—Plans and specifications have been prepared for the extension of the Ringing Rocks trolley line, recently acquired by the Schuylkill Valley Traction Co., to Boyertown; heavy steel will be put down and the bridges will be of steel on concrete foundations; the old bridge south of the Ringing Rocks power house will be replaced by one of steel, 97 feet long, and a steel trestle and bridge, 500 feet long, will be built across the lake in Ringing Rocks Park and from there

to Swamp the line will be through private right of way; a bridge, 60 feet long, will be built over Mintzer's Run at Swamp.

Corpus Christi, Tex.—The Corpus Christi Street Railway Company has been organized to build an electric road.—W. C. Blake, President.

Dallas, Tex.—The Dennison-Sherman-Dallas Interurban Railway has issued \$3,000,000 worth of first mortgage bonds, \$2,000,000 of which is to be used for construction purposes and \$1,000,000 held as a fund for branch lines and extensions.

Ogden, Utah.—The Utah Light & Railway Company has purchased the vacant corner of land on Twenty-third and Moffet's avenue, where it will erect a large brick building as a sub-station; the building will be equipped with the most modern electrical machinery with a voltage of over 25,000.

BRIDGES

Ft. Smith, Ark.—The Midland Valley Railway has decided to rebuild bridge across the Canadian river.—J. F. Holden, General Manager.

Bridgeport, Conn.—The Board of Aldermen has voted an appropriation of \$200,000 for the new Congress street bridge, in spite of the fact that it had previously voted that the amount to be expended for the bridge would be \$150,000.

Chicago, Ill.—Members of the Southwest Improvement Association petitioned the Drainage Board to build a bascule bridge of modern type across the main channel of the Sanitary District canal at Western avenue, to cost \$100,000.

St. Charles, Ill.—The Chicago & Great Western Railway is preparing to rebuild the viaduct which spans tracks and which the City Council of St. Charles closed to the street car company several weeks ago.

Wichita, Kan.—Mayor Finlay Ross has received word from C. R. Gray, Vice-President of the Frisco System, that his road will erect a new steel trestle bridge across the drainage canal where it intersects the Frisco right-of-way. The bridge will be a steel trestle structure about 60 feet in length. The canal crosses the right-of-way of the road near Twelfth street.

Pittsfield, Mass.—The Boston & Albany is considering the construction of two steel bridges to replace wooden bridges at First street and Benedict road; the former will be 43 feet wide and the latter 21 feet.

International Falls, Minn.—The Town Board expects soon to advertise for bids for the construction of a bridge at Malmelin's Ferry.

St. Paul, Minn.—A new steel bridge over the glen at Minnehaha to the Soldiers' Home is provided for in a bill introduced in the House of Representatives. An appropriation of \$40,000 is also provided for a wagon and foot bridge to replace the present wooden foot bridge.

Laconia, N. H.—The city, sharing the expense with the street railway company, will build a concrete bridge over the street railway company's power canal; estimated cost, including paving, \$10,000.

Hoboken, N. J.—The Board of Freeholders will receive bids, March 7, for the purchase of \$350,000 viaduct bonds.—Walter O'Mara, Clerk.

Jersey City, N. J.—Bids will be received, March 7, 4 p. m., for \$350,000 4 per cent. semi-annual new viaduct bonds.—Walter O'Mara, Clerk, Board of Chosen Freeholders.

Bryan, O.—The County Commissioners have passed a resolution authorizing the construction and repair of a number of bridges in various townships; twenty-one improvements are authorized under this order, including the construction of a superstructure for the Umbenaur bridge in Madison township and sub and superstructures for each of the following: Barkdoll, Shoemaker and Brownell bridges in Brady; Center, Bailey, Hultz and Bender bridges, Center township; Rocky and Mark bridges, Florence; Southwell, Northwest, Knox, Madison, Dick, Millcreek; Oberlin, Jefferson; Bloom and Lutv. Springfield; East Griser, Bridge-water; Sharp, Randalls and Casebere, St. Joseph; and the Marsh bridge in Pulaski township.

Dayton, O.—The County Commissioners have under consideration the erection of a \$15,000 bridge across the river south of the city.

Lorain, O.—The Lake Erie & Pittsburg railroad has made formal application to the Cuyahoga County Commissioners for a franchise to close six highways; the contract as presented asks for the privilege of putting in wooden bridges with twenty-foot drives.

Norwood, O.—City officials will receive a request from the Hyde Park Business Club within the next few days to join in a movement to have a viaduct built over Duck Creek from Edwards road to the street that is platted through the U. S. Playing Card Company's grounds.

Portsmouth, O.—The County Commissioners of Scotia county have decided to construct steel bridge across Bond Run on the Buena Vista pike, to replace present wooden covered bridge.

Ontario, Ore.—A State appropriation of \$25,000 is asked for by a bill introduced in the House by Representative King, of Malheur, for the construction of a bridge across the Snake river; the appropriation being contingent upon the appropriation of a like sum on the part of Malheur county; the bill also provides for the appointment of the Board of Snake River Bridge Commissioners.

Nashville, Tenn.—Senator Carmack's bill to authorize the building of two bridges over the Cumberland river at Nashville was favorably reported by the Senate Committee on Commerce.

Goldendale, Wash.—Heavy damage has been done to the roads and bridges; the county intends to replace most of the bridges by first-class structures.—A. L. Richardson, County Surveyor.

MISCELLANEOUS

Glendale, Cal.—An election will be held to decide the question of issuing \$20,000 bonds for the erection of City Hall and purchase of fire apparatus.

Bridgeport, Conn.—Council has voted in favor of issuing bonds for city improvements.

Grand Rapids, Mich.—The Ways and Means Committee of Council has decided to petition Legislature for authority to issue \$1,000,000 flood-protection bonds.

Gastonia, N. C.—The city has petitioned Legislature for authority to issue \$100,000 bonds for improvement purposes.

Cincinnati, O.—It is proposed to change the channel of the Miami river in Edgemont and South Park, that it may follow New river; heavy expense will be involved in the

condemnation of ground and the construction of levees; a new concrete bridge is to be erected.

Laurens, S. C.—Council has petitioned Legislature for authority to issue improvement bonds.

Chattanooga, Tenn.—An election will be held, March 12, to decide question of issuing \$1,000,000 bonds for paying for floating indebtedness and for improvement purposes.

Trenton, Tenn.—Council will petition Legislature for authority to issue \$60,000 bonds for improvement purposes.

Houston, Tex.—The Board of Harris County has called an election to decide the question of issuing \$600,000 bonds for Court House and \$400,000 bonds for bridge and road purposes.

LOWEST BIDS FOR STREET PAVING

Square Yards	SURFACE MATERIAL		FOUNDATION		OTHER MATERIAL		Contract Price per Sq. Yd.	EXCAVATION			REMARKS
	Kind	Thickness	Kind	Thickness	Kind	Thickness		Quantity Cu. Yds.	Material	Price	
16,920	Crushed granite 3½"		Crush'd l'st'ne	12"			OAK PARK, ILL. \$1.245				Excavation included in price for paving.
4,390	L'stone, 1½"	3"	L'stone, 2½"	6"			WINNIPEG, CANADA 0.80				
8,728	Cedar block	6"	Sand	1" boards	2"		BEN AVON, PA. 1.20				
21,202	2½ stone	5"	Rough stone	8"	Screenings		EASTON, PA. 1.25	16,108	Earth	\$0.40	
1,518	Cl' field block		Macadam	6"			ELKHART, IND. 2.28	None			
17,392	Brick		Crushed stone	6"	Sand	1½"	AUBURN, N. Y. 1.49				Excavation included in price for paving.
10,500	Brick		Concrete	6"	Sand		2.20				Excavation included in price for having Mack or Met'tan Bl'k.
18,800	Asphalt	3"	Concrete	6"			1.75				Excavation included in price for paving.
7,435	Brick		Concrete	5"	Asp. filler		RACINE, WIS. 2.15				
11,594	"		"	5"	Sand		2.18				
7,670	"		"	5"	Asp.		1.99				
6,520	"		"	5"			2.17				
16,230	Asphalt						1.98				
25,000	Brick		Concrete	6"	Sand		VICKSBURG, MISS. 2.25	900 sq. yds. gr'l & dirt.		0.42	
2,500	Brick	4"	Concrete	5"	Sand		MATTOON, ILL. 1.375	1,000 sq. yds.		\$0.25	Grout filler 10 cts. per sq. yd.
25,000	Brick		Brick	2½"	Cinderf'nd.	4"	PITTSBURG, KAN., JUNE 6, 1906 1.20	8,000	Dirt		Excavation included in price for paving.
3,330	Brick		Gravel	8"	Sand		ASHLAND, O. 1.455	2 200	Clay	0.25	
5,750	Brick		Gravel	10"	Sand		1.305	2,350	Clay	0.25	
14,000	Brick	1:3:5 Concrete	4"				MANSFIELD, O. 1.27	12,000	Clay	0.25	Cement furnished by city.
8,000	Brick	1:3:5 Concrete	4"				1.35	4,000	Clay	0.30	" " " "
4,000	Brick	1:3:5 Concrete	4"				1.36	3,000	Clay	0.27	" " " "
76,986	Brick	Concrete	6"		Grout filler		CANTON, O. 1.96				Excavation not included.
65,589	Brick	Concrete	6"		Pioneerasp. filler		2.04				Excavation not included.
9,700	Brick						PORT CHESTER, N. Y. 2.55	{ 3,000 Earth		0.35	
								{ 200 Rock		2.00	
	Brick				Sand cushion		SANDUSKY, O. 0.87				Does not include foundation. Sand cushion 5 cts. additional; 1:3 G rout filler 9 cts. additional
5,120	Has'm conc'te	6"					NASHUA, N. H. 1.30				Excavation not included.
6,667	Tar Macad.	2"	Crushed stone	6"			DULUTH, MINN. 0.90	{ 4,330 Rock		2.50	
								{ 1,950 Earth		1.00	
9,500	Met'n block	Concrete	6"		Cement filler		PORT HURON, MICH. 1.46				Ten year guarantee.

LOWEST BIDS FOR SIDEWALKS AND CURBING

SIDEWALKS					CURBING						REMARKS	
Area, Sq. Ft.	SURFACE MATERIAL		FOUNDATION		Contract Price	RESETTING OLD			SETTING NEW			
	Kind	Thick- ness	Kind	Thick- ness		Lin- eal Feet	Char- acter of Work	Contract Price	Lin- eal Feet	Character of Work		Contract Price
RAYNE, LA.												
40,000	{ Cement, 3:5..	3"	{ Sand.....	2"	\$0.105				7,000	Brick curb.....	\$0.50	Curb 8" thick, 24" high; outside and top faced with 1" cement mortar. Filling and removing trees included in price.
	{ Concrete, 1:3:5	3 1/4"										
ST. BERNARD, O.												
40,000	{ Cement.....	1"	{ Cinders....	8"	0.11							Includes excavation.
	{ Concrete.....	3"										
PEN AVON, PA.												
									18,700	Dressed sandstone	0.70	
									820	Und's'd sandstone	0.50	
MANSFIELD, O.												
33,300	{ Cement, 1:2	3"	{ Mill cinders.	8"	0.08 1/2				5,000	6x18 Berea stone..	0.62	Sidewalk prices are exclusive of cement and excavation. Curb prices are exclusive of cement, include 4" tile drain.
	{ Conc'te, 1:3:5	4"										
26,100	Berea flagstone	2 1/2"	Mill cinders.	8"	0.15				5,600	Cement curb and gutter.....	0.48	

BIDS RECEIVED

Waterbury, Conn.—Henry Spinach was low bidder for constructing surface water drains in Grove street, at \$2,689.50; Keating & Egan bid \$3,287.40 and Edward McManus, \$3,777.62. —R. A. Cairns, City Engineer.

Calro, Ill.—Owing to irregularities in certified checks accompanying bids for constructing 9,699 feet of concrete main sewer, etc., they were rejected; the lowest bid was \$94,000; new bids are invited, March 12.—U. B. Thistlewood, City Engineer.

Oak Park, Ill.—M. H. McGovern has been awarded contract for 16,920 yards of granite paving on macadam pavement, 1½-inch, at \$1,245, excavation included; also for resetting 2,000 feet of old curb at 10 cents per foot and setting 11,800 feet of new cement curb, at 59 cents per foot.—B. C. Brandstadt, Secretary, Board of Local Improvements.

Elkhart, Ind.—W. Worth Bean, Sr., was, February 18, awarded contract for constructing 17,392.4 square yards, Hocking Valley brick, on 6-inch crushed stone and 1½-inch of sand, at \$1.49 per square yard, including excavations; 9,025.5 lineal feet concrete curb, 5x7x24 feet, at 30 cents per foot; and 42 catchbasins, complete, at \$40 each; total, \$30,302.41; bids were also received on Athens Nelsonville, Logan and Metropolitan block; other bidders on the work were: J. N. Moran, Northern Construction Company, Moellering Construction Company, Neal Bercaw and W. W. Hatch & Son.—A. M. Smith, City Engineer.

Rensselaer, Ind.—The Commissioners of Jasper County have awarded to W. F. Smith & Co. the contract for 36 miles of stone road, at their bid of \$1,358 per mile.

Detroit, Mich.—The Co-Operative Foundry Company has been awarded contract to furnish following supplies during the year ending January 31, 1908: round locking covers, \$2.75 each; iron castings, \$2.49 per 100 pounds; \$26 per ton for scrap iron; manhole rings and covers, complete, \$10.50; horse drinking fountains, \$40.

Detroit, Mich.—Garrier Brothers have been awarded contract for constructing all artificial storm sidewalks and intersection walks required and ordered during the year, at 10% cents per square foot for streets in the Eastern District, and 12 cents for the Western District; proposals were also submitted by John A. Mercler, John Archer, R. D. Baker & Co., John Junga and Schilling Bros.—J. J. Haarer, Commissioner of Public Works.

Crookston, Minn.—James Kennedy, of Fargo, N. D., was low bidder and was awarded contract for constructing sewers, at \$6,903.66, as follows: 846 feet 24-inch double-strength vitrified pipe, at \$3; 1,106 feet 15-inch vitrified pipe, at \$1.62; 1,575 feet 9-inch vitrified pipe, at \$1.10; clay excavation and handling ground water; J. E. O'Brien & Co. was awarded contract for constructing 300 feet of 30-inch double-strength vitrified pipe, at \$4.20 per foot; P. McDonnell, of Duluth, bid \$6,935.40 and A. M. Sivertson, \$6,967.88 for the work on which Kennedy was awarded the contract, and James Kennedy, \$5.05, and P. McDonnell, \$4.50 for the 30-inch pipe on which O'Brien & Co. were awarded contract; the wages of common labor are \$2.25 per day and brickmasons \$6 per day; Kennedy will furnish manholes for \$58 and catchbasins, 12½ feet deep, bottom 4½ feet diameter, for \$63.—J. E. Carroll, City Engineer.

Elbow Lake, Minn.—J. H. Olsen, of Willmar, has been awarded contract to build new schoolhouse, 60x128 feet, two stories and basement, for \$30,000; H. Kelley & Co., of Minneapolis, has the contract for heating, plumbing and fan ventilating.

West New York, N. J.—Henry & Emmer have been awarded contract to lay sewer through Dewey avenue and the northeastern section of the town, at \$24,480; Joseph Rosetti has contract for constructing sewer in Adam street.

Cleveland, O.—Stephen Pratt, of Detroit, Mich., was awarded contract to furnish six digesters and appurtenances for the Cleveland Garbage Disposal Plant, bids for which were received, February 19, at \$469.69 each, the digesters to be 54-inch inside diameter by 14 feet long; sheets, heads and butt-straps of flange steel, 60,000 pounds tensile strength, ¾ inch thick. The Atlas Car and Manufacturing Company submitted a proposal to furnish for the disposal plant six steel side-dump standard-gauge cars, complete and delivered, at \$2,705 each, cars to have a capacity of 1,400 cubic feet, truck and under-frame of cars M.C.B. standard, 80,000 pounds capacity.

Cleveland, O.—The Great Lakes Dredge & Dock Company was awarded contract for dredging approximately 50,000 cubic yards from the lower section of the Cuyahoga river, and placing it behind the protection work between West Third and East Ninth street, at 23 cents per yard, and approximately 100,000 cubic yards in Section 2, and disposing of it in the same manner at 27 cents per yard; proposals were also submitted by the Graves & Stephens and G. H. Breymann & Brothers.

Springfield, O.—W. F. Paine has the contract for paving Thrasher street and Wood-

bine avenue; the first for \$1,300, and the last for \$8,000; Mr. Paine has also been awarded the contract for paving Center street at his bid of \$312,607; he will use Ohio sandstone for the curbing.

Youngstown, O.—Contractor H. Fleming is the low bidder on the Oskhill avenue paving and the Front and Canal street work; his bid on brick is \$45,700.

Cleveland, O.—John A. Roebing's Sons Company were awarded contract to furnish weather-proof wire for the municipal electric-light plant, bids for which were received February 14, as follows: No. 6 B. & S. gauge weather-proof wire, 12 tons, at 27.3 cents per pound; 110-strand, 6 tons, at 27.3 cents per pound.

The W. M. Patterson Supply Company was awarded contract on bids, received February 15, for 2,000 13-inch glass domes, at 40.5 cents; 5,000 14-inch enameled steel domes, at 62 cents; 5,000 7¼-inch zinc ventilators, at 19 cents; Kinney & Levan were awarded contract for 13,000 16-inch glass globes, at 59 1-6 cents, and 2,000 14-inch glass globes, at 57 cents. The Standard Oil Company of Ohio was low bidder for furnishing 125,000 gallons 70-72 degrees gasoline, at 18 cents, and deodorized red crown gasoline, for 15 cents, and the Engeline Refining Company for Engeline, at 15 cents. The bids will probably be rejected. The Cleveland Gas Appliance Company was low bidder for furnishing 120,000 ordinary cap mantles for gas lamps, at 7.7 cents, and 20,000 special weave for gasoline lamps, at 8 cents. The mantles will be tested before contracts are awarded.

Montoursville, Pa.—A. C. Eberhardt, of Berwick, has been awarded contract for three-story brick school building, with Hummelstown brownstone trimmings and the Carpenter system of heating.

Norfolk, Va.—Louis Lawson has been awarded contract to pave Liberty, Main and Berkley avenues, Berkley Ward, for 60 cents per square yard, the city to furnish the Belgian block and the contractor to do the necessary excavation and furnish other materials.

Norfolk, Va.—The La France Engine Company has been awarded contract to furnish combination chemical and hose wagon for Berkley Ward, for \$1,950.

Racine, Wis.—James Cape & Sons were low bidders for paving West Sixth street, 7,435 square yards, brick on 5-inch concrete foundation, asphalt filler, at \$2.15 per square yard, and 2,555 lineal feet, concrete curb, at 50 cents; John O. Jones was low on Fourteenth street, 11,594 square yards brick, on 5-inch concrete foundation, asphalt filler, at \$2.18 per square yard, and 6,657 lineal feet, concrete curb, at 53 cents; E. R. Harding was low on La Fayette avenue, at 7,670 square yards, brick, 5-inch concrete foundation, sand filler, at \$1.99, and 3,720 lineal feet concrete curb, at 51 cents; R. R. Birdsall was low on Sixteenth street, 6,520 square yards, brick, 5-inch concrete base, asphalt filler, at \$2.17 per yard, and 3,792 feet concrete curb, at 50 cents; P. B. Johnson was low on Wisconsin street, 16,230 square yards, asphalt, at \$1.98, 1,596 lineal feet, stone curb, at 20 cents, and 11,858 feet, concrete curb, at 50 cents; action on all bids was deferred. —P. H. Connolly, City Engineer.

THE almost World-wide tendency among the municipalities to go over to the wood-block in preference to the other pavements has been brought about by its record on the London and Paris foundations. We can sell you this foundation at one-half the London and Paris prices. Over twenty-five years ago the creosote wood paving-block fell into utter disrepute in America, on account of the American foundation. The Nash Road, Borough of Brooklyn, New York City, U. S. A.

OPPORTUNITIES describes hundreds of high grade technical positions now open. Sample copy free. Write us to-day, stating age and experience. Hapgoods, 305 Broadway, New York.

Proposals

Viaduct

New Orleans, February 21, 1907.

Pursuant to Ordinance No. 4301, N. C. S., sealed proposals will be received at the office of the Comptroller in the City of New Orleans until the hour of 1 p. m., Monday, April 29, 1907, for the construction of a viaduct over the tracks of the Southern Pacific R. R. Co., on the line of Newton street in Algiers, in accordance with the plans and specifications on file in the office of the City Engineer.

Deposit \$1,000.00 with the City Treasurer and his receipt enclosed with bid.

Bond in an amount equal to the contract price.

The City Engineer will furnish bidders with a blank form of proposal. No proposal will be considered unless submitted on such form.

Bidders must have paid their City license in order that their bids may be accepted.

The city reserves the right to reject any and all bids.

CHAS. R. KENNEDY, Comptroller.

Bridge

Camden, N. J.

Bids are invited for building a superstructure 96 feet long for a through truss highway bridge over Big Timber Creek, at Clements Bridge, between the Counties of Camden and Gloucester, N. J. Bids will be received, immediately opened and publicly read at the regular meeting of the Camden County Board of Chosen Freeholders to be held in Camden on Wednesday, March 13, at 11 a. m.

Plans and specifications will be mailed to any address on receipt of 25 cents on application to Fred W. George, Clerk, Camden, N. J., or can be seen at his office in Court House, Camden, N. J., at the office of Engineering News Pub. Co., or at the office of Chas. N. Bell, Clerk, Woodbury, N. J.

By order of both counties.

J. J. ALBERTSON,

Engineer in Charge for Camden and Gloucester Counties.

Dated, Magnolia, N. J., Feb. 15, 1907.

Cement

Brandon, Manitoba, Can.

Sealed tenders addressed to the Chairman of Board of Works and endorsed "Tender for Cement," will be received by the undersigned until 12 o'clock noon of Thursday, April 11, 1907, for supplying from 6,000 to 8,000 barrels of Portland cement to the City of Brandon.

Specifications and form of tender may be obtained on application to W. H. Shillinglaw, City Engineer, Brandon, Man.

The lowest or any tender not necessarily accepted.

HARRY BROWN, City Clerk.

Brandon, Manitoba, Canada, February 8, 1907.

STREET LAMP ATTACHMENT

The present flat flame gas light quickly changed to

BEST MODERN LIGHTS.

Lamps giving 10-25 candlepower made to produce 40 to 70 candlepower. No additional gas consumed

CENTURY LIGHT & POWER CO.
35 Warren St., N. Y. City

USING KENTUCKY ROCK ASPHALT IN PLACE OF SCREENINGS FOR MACADAMIZED ROADS

"THE WADSWORTH" MACADAM

PRODUCING A DUSTLESS, MUDLESS, NOISELESS AND WATER-PROOF ROADWAY. NO HEATING REQUIRED

The Coming Roadway

Write for Descriptive Booklet

The Wadsworth Stone & Paving Co., 405 Bessemer Bldg., Pittsburg, Pa.

PERSONALS

BEADLE, A. B., of New York City, and James T. Lynn, of Detroit, Mich., have been appointed by Mayor William B. Thompson, of Detroit, as the city's representatives to investigate and report upon the conditions of the distributing system of the Detroit City Gas Company and on such other matters as pertain to the gas question.

BIDDLE, JOHN, Engineer Commissioner of the District of Columbia for several years, has been promoted from the rank of Major to that of Lieutenant-Colonel, Corps of Engineers, U. S. Army, as a result of two retirements from the corps.

CHARWICK, FRED. R., has been appointed City Engineer of Medford, Mass., by Mayor Clifford M. Brewer, succeeding Edward P. Byrne, and has been confirmed by the City Council.

CLARK, JAMES W., Director of the Department of Public Works of Pittsburgh, Pa., died recently, aged 58 years. A. B. Shepard, Superintendent of the Bureau of Water, is acting temporarily as Director until the appointment of a successor by Mayor George W. Guthrie.

CONNELLY, JAMES F., City Clerk of Newark, N. J., who has been ill for five weeks with lobar pneumonia, has returned to his duties at City Hall.

CONWAY, E. S., and the other Directors of the Commercial Association of Chicago, Ill., are bitterly opposed to the procrastination of the Drainage Board in opening the Chicago drainage canal to navigation, and the River Improvement Committee, of which Captain Dennis Sullivan is chairman, has been instructed to investigate the bill recently introduced in the Legislature, which would delay for three years the opening of the canal to big ships.

EMERY, JOHN P., has been elected Mayor of Franklin, Pa.

FLYNN, DR. E. N., Mayor of Jeffersonville, Ind., Laurant A. Douglas, member of the Board of Public Works, and Thomas W. Perry, City Treasurer, have been visiting Indianapolis in an effort to induce members of the State Legislature to prevent a change in the cities and towns law, which would make Jeffersonville a fifth class, instead of a fourth class city.

GILLESPIE, WILLIAM H., has been elected Mayor of Pittston, Pa., defeating Louis Seitel.

HARLOW, HENRY, Mayor of Onawa, Ia., President of the Iowa Good Roads Association, has been appointed by the Governor as delegate to represent the State at the conference of the Good Roads Commissioners at Pittsburg, Pa., March 12.

HUNTER, S. F., Chief of the Fire Department of Springfield, O., recently entertained Fire Chief Blaire, of Bellefontaine, who has been inspecting combination wagons, with a view to the purchase of one for his department in the near future.

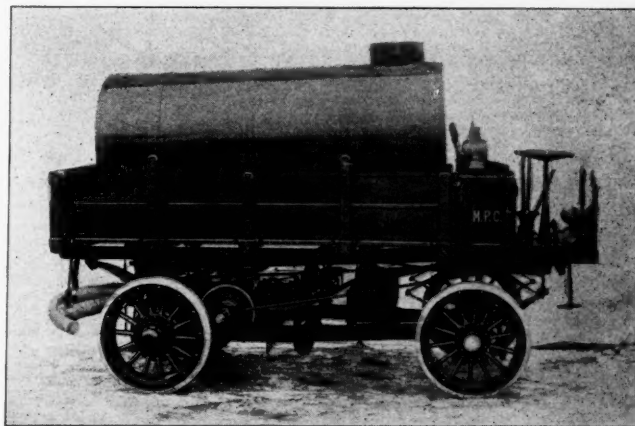
JOHNSON, W. R., was elected as the first Mayor of Park City, Tenn., a suburb of Knoxville, by his associates on the Board of Aldermen, when the city government was organized recently. The Aldermen who are now busy preparing ordinances for the new municipality are: A. Greenwood, John Dailey, Chris. C. Cruze, W. H. Underwood, Geo. L. Price, G. L. Moore, W. A. Davis, W. R. Johnson and Capt. Thos. Dooley.

PORTER, DR. JOSEPH Y., State Health Officer of Florida, has recommended the employment of an expert sanitary engineer to have charge of all sanitary improvements made by the State Board of Health.

WARD, GEORGE B., has been reelected Mayor of Birmingham, Ala.; W. E. Wier, Chief of Police; George Eustis, City Treasurer; John McCartin, Tax Collector; W. H. Abernathy, City Electrician; Charles Eckerle, City Plumbing Inspector; John Lind, Building Inspector; Edward D. Smith, City Attorney; Julian Kendrick, City Engineer; D. R. Copeland, City Auditor; J. J. Boggan, License Inspector.

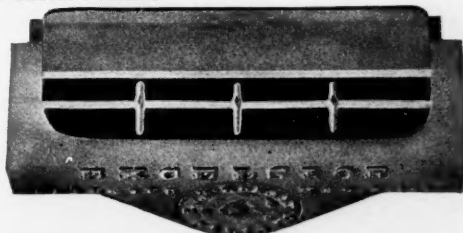
Trade Notes

TRUCK AND SPRINKLING WAGON.—In the accompanying illustration is shown an Atlas B type truck equipped with a water tank and sprinkling apparatus as used by the Metropolitan Park Commission near Boston, Mass. Both the tank and sides are removable, making it easily convertible into either a supply wagon or a sprinkling truck. The capacity of the tank is 800 gallons and the spray covers about 40 feet of roadway. The driver, of course, controls the sprinkler as well as the engine. A large water supply pipe is used for quick filling. The motor is a 24-horsepower Atlas water-cooled engine. The two six-inch cylinders have a seven-inch stroke capable of driving the truck at ten or twelve miles an hour, loaded. Especial merit is claimed for the truck in backing and turning in close quarters. An instance of the performance of this truck when used for supplies is related in connection with its trips between Boston and Roxbury—17 miles round trip. Four trips a day were made with sixteen tons. The total cost of the day's work, including wages, gasoline and oil, was \$5.44, or 34 cents per ton.



ATLAS GASOLINE TRUCK

SEWER INLET.—W. H. M'Donald & Co., Galion, O., manufactures a sewer inlet with an adjustable plate over which the gutter pavement may be laid, allowing the gutter to vary from 5½ to 9½ inches in depth below the sidewalk. The water may measure 30 inches horizontally and is protected by a strong wrought-iron grate of any desired mesh. The bottom of the casting is flanged to give it a good bearing on the brick work or concrete on which it rests; or it may be provided with a reducer to fit a sewer pipe of any size desired. The inlet can be adjusted to the curb line and is neat in appearance. The same company makes a metal form for use in constructing concrete catch basins.



THE "EXCELSIOR" SEWER INLET

ASPHALTOILENE.—The Good Roads Improvement Co., 805 Traction Building, Cincinnati, issue a booklet describing the use of their preparation, "Asphaltoilene." The "White Oiler," a tank wagon and sprinkling device, is illustrated, and testimonials from city officials are added.

TRANSACTS A GENERAL BANKING AND TRUST COMPANY BUSINESS

ROBERT S. BRADLEY, President	CLARK WILLIAMS, Vice-President
LANGLEY W. WIGGIN, Secretary	HOWARD BAYNE, Treasurer
PARK TERRELL, Mgr. Bond Dept.	DAVID S. MILLS, Trust Officer

CAPITAL
AND
SURPLUS
\$2,000,000.

**COLUMBIA
TRUST
COMPANY**

TWENTY-SIX
NASSAU ST.
NEW YORK

OFFERS A PRACTICAL METHOD FOR THE ISSUE OF MUNICIPAL BONDS

AFFORDING ADEQUATE SAFEGUARDS AGAINST FORGERY AND OVER-ISSUE, AND SERVING THE CONVENIENCE OF THE ISSUING OFFICIALS. SEND FOR BOND PAMPHLET No. 6.

ACTS AS FISCAL AGENT FOR STATES AND MUNICIPALITIES.

INDEPENDENT OF THE CONTROL OF ANY SINGLE INTEREST.

BOOKS

Which the Street Department Should Have

STREET PAVEMENTS AND PAVING MATERIALS.—A Manual of City Pavements; the Methods and Materials of their Construction. For the Use of Students, Engineers and City Officials. By Geo. W. Tillson, C. E. 8vo, xii + 532 pages, 60 figures. Cloth, \$4.00.

CONTENTS.—The History and Development of Pavements. Stone. Asphalt. Brick-clays and the Manufacture of Paving-brick. Cement, Cement Mortar, and Concrete. The Theory of Pavements. Cobble and Stone-block Pavements. Asphalt Pavements. Brick Pavements. Wood Pavements. Broken-stone Pavements. Plans and Specifications. The Construction of Street-car Tracks in Paved Streets. Width of Streets and Roadways, Curbs, Sidewalks, etc. Asphalt Plants.

A TREATISE ON ROADS AND PAVEMENTS.—By Ira Osborn Baker, C. E. 8vo, viii + 655 pages, 171 figures, 68 tables. Cloth, \$5.00.

CONTENTS.—Introduction. Part I.—Country Roads. Road Economics. Road Location. Earth Roads. Gravel Roads. Broken-stone Roads. Miscellaneous Roads. Equestrian Roads and Horse-race Tracks. Part II.—Street Pavements. Pavement Economics. Street Design. Street Drainage. Curbs and Gutters. Pavement Foundations. Asphalt Pavements. Brick Pavements. Cobble-stone Pavement. Stone-block Pavements. Wood-block Pavements. Comparison of Pavements. Sidewalks. Bicycle Paths and Race Tracks.

CITY ROADS AND PAVEMENTS SUITED TO CITIES OF MODERATE SIZE. Second edition, revised and enlarged.—By W. P. Judson. Containing chapters on—Preparation of Streets for Pavements; Modern Pavements; Concrete Base for Pavements; Pavements of Block Stone; Wood; Vitriified Brick; Asphalt; Bituminous Macadam; Broken Stone, etc. Cloth; 6 x 9 ins.; 200 pp.; illustrated. \$2.00.

ECONOMICS OF ROAD CONSTRUCTION.—Second edition, enlarged. By Halbert Powers Gillette. 8vo, 49 pages, 9 figures. Cloth, \$1.00.

CONTENTS.—Historic Review. Earth Roads and Earthwork. Gravel Roads. Macadam Roads. Telford Roads. Repairs and Maintenance. Suggested Improvements in Existing Road Specifications. Summary and Conclusions.

ROADS: THEIR CONSTRUCTION AND MAINTENANCE. With Special Reference to Road Materials. By Allan Greenwell and J. V. Eidsen. 12vo, 280 pages, 48 illustrations. Cloth, \$1.50.

HIGHWAY CONSTRUCTION.—Fourth edition, revised and enlarged. By A. T. Byrne. 8vo, xl + 895 pages, 306 illustrations. Cloth, \$5.00.

CONTENTS.—General Considerations Concerning Pavements, Materials and Economics. Characteristics, Construction and Cost of Various Pavements. Stone Trackways. Plank and Log Roads. Foundations. Concrete. Resistance to Traction. Width of Tires. Location of Country Roads. Width and Transverse Contour of Roads and Streets. Streets. Earthwork. Drainage. Bridges. City Streets. Footpaths. Curbs and Gutters. Reconstruction of Country Roads. Maintenance. Repairing. Cleaning and Sprinkling Roads and Streets. Staking Out Work. Trees and Highways. Machinery Employed.

THE MODERN ASPHALT PAVEMENT.—By Clifford Richardson. 8vo, 580 pages. Cloth, \$3.00.

CONTENTS.—Introduction. Part I.—The Base and Intermediate Course. Part II.—The Materials Constituting the Asphalt Surface Mixture. Part III.—Native Bitumens in Use in the Paving Industry. Part IV.—Technology of the Paving Industry. Part V.—Handling of Binder and Surface Mixture on the Street. Part VI.—The Physical Properties of Asphalt Surfaces. Part VII.—Specifications for the Merits of Asphalt Pavement. Part VIII.—Causes of the Defects in and the Deterioration of Asphalt Surfaces. Part IX.—Control of Work.

STREET CLEANING AND THE DISPOSAL OF A CITY'S WASTE.—By Geo. E. Waring, Jr. 230 pp.; 30 illustrations. \$1.25.

For Information, Address

MUNICIPAL JOURNAL AND ENGINEER

Flatiron Building

New York City



Prices for LARGE PRINTS up to 4 1/2 x 12 Ft.

BLACK PRINTS on paper per Square Foot 3c.

BLUE PRINTS on paper per Square Foot 2c.

BLUE or BLACK PRINTS on CLOTH per Square Foot 5c.

Sample Prints mailed on Application. Write for Price List No. 16 of

DRAWING MATERIALS

and Samples of Drawing Papers

E. G. SOLTSMANN, 125 East 42d St., New York, N. Y.



LEADITE

THE BEST PIPE JOINTING MATERIAL
FOR WATER AND GAS MAINS ETC.

NO PAULING REQUIRED. COST LESS THAN ONE-THIRD THE COST OF LEAD. ONE TON WILL DO MORE WORK THAN FIVE TONS OF LEAD. JOINTS WILL NEVER LEAK. IN USE 11 1-2 YEARS IN PHILADELPHIA, PA. NOW ADOPTED BY WATER DEPARTMENT. IN USE IN MANY CITIES.

WRITE FOR PAMPHLET, PRICES, ETC.

THE LEADITE COMPANY OF AMERICA
642 CEDAR BUILDING, PHILADELPHIA

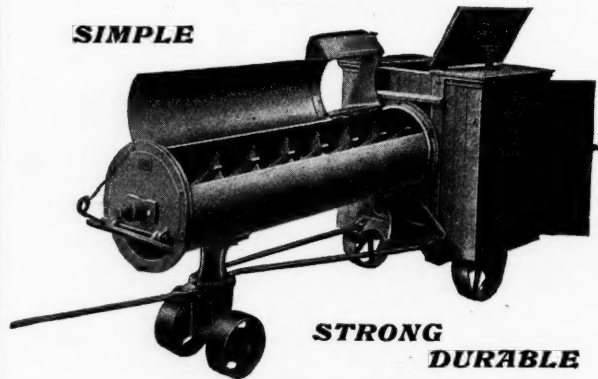
THE GRANT

The Only MORTAR MIXER on Earth

Guaranteed to keep 100 brick or stone masons busy. Makes the richest of mortar and tempered to the right consistency with 20 per cent. less time.

No better cement and concrete mixer of its capacity is on the market. Ask for Booklet E and Prices.

SIMPLE



STRONG
DURABLE

U. S. Concrete Machine Co., Detroit, Mich., U. S. A



EUREKA FIRE HOSE

is the highest possible grade of SEAMLESS COTTON Rubber Lined Fire Hose that can be manufactured.

All Sizes for Every Possible Duty.

"Eureka" (Four Ply) "Paragon" (Three Ply) "Red Cross" (Two Ply)

Send for Price List and Samples.

EUREKA FIRE HOSE CO., 13 Barclay Street, New York

BOSTON

PHILADELPHIA

CHICAGO